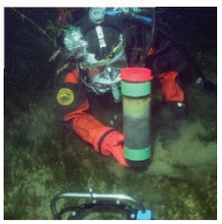
Canadian Great Lakes Areas of Concern | Secteurs préoccupants des Grands Lacs canadiens



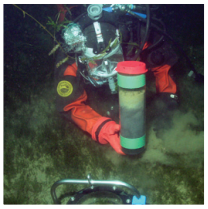
Beneficial Use Impairments Status Report
Rapport du statut des altérations des utilisations bénéfiques

September/septembre 2010

Ontario

Canada

Canadian Great Lakes Areas of Concern



Status of Beneficial Use Impairments Overview

September 2010

Ontario

Canada

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This overview provides a brief introduction to the Areas of Concern program in the Great Lakes and the community-focused remedial action plan process established to address environmental challenges in these areas. It also serves as background to the 15 individual 2010 status of beneficial use impairments reports prepared for the 14 remaining Areas of Concern and Wheatley Harbour, which has recently been removed from the list of Areas of Concern.

Areas of Concern

For more than 20 years, local residents, community groups, Aboriginal communities and industries have been working in partnership with federal, provincial and municipal governments to restore environmental quality in the Great Lakes. As part of these efforts, attention has been focused on cleaning up sites where past (and, in some cases, ongoing) industrial and agricultural practices or urban development pressures have caused degradation and led to impairments.

In 1987, Canada and the United States amended the Great Lakes Water Quality Agreement to include a commitment to the identification and remediation of significantly degraded areas throughout the Great Lakes. Together, Canada and the United States have identified 43 Areas of Concern, which are geographic areas where severe water quality degradation has resulted in the impairment of beneficial uses of the environment (typically referred to as *beneficial use impairments*) and which contribute adversely to the overall quality of the Great Lakes. Beneficial use impairments are defined under the Great Lakes Water Quality Agreement as

1. Restrictions on Fish and Wildlife Consumption
2. Tainting of Fish and Wildlife Flavour
3. Degraded Fish and Wildlife Populations
4. Fish Tumours or other Deformities
5. Bird (or other Animal) Deformities or Reproduction Problems
6. Degradation of Benthos
7. Restrictions on Dredging Activities
8. Eutrophication or Undesirable Algae
9. Restrictions on Drinking Water Consumption or Taste and Odour Problems
10. Beach Closings
11. Degradation of Aesthetics
12. Added Costs to Agriculture or Industry
13. Degradation of Phytoplankton and Zooplankton Populations
14. Loss of Fish and Wildlife Habitat

Three Canadian Areas of Concern (Collingwood Harbour in 1994; Severn Sound in 2003; and Wheatley Harbour in 2010) and one United States Area of Concern (Oswego River in 2006) have been fully remediated and officially removed from the list of Areas of Concern. Currently, there are 9 Areas of Concern on the Canadian side of the Great Lakes, 25 in the United States, and 5 that are shared by both countries (the St. Marys, St. Clair, Detroit, Niagara and St. Lawrence rivers) (Figure 1). These areas vary widely in size and nature. Some are located at small, relatively isolated one-industry towns where past discharges into the lakes have left

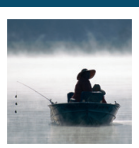
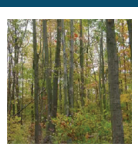
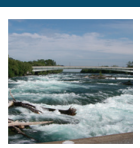




Figure 1: Map of Canadian Areas of Concern

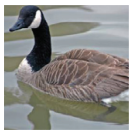
a legacy of risks to the local fish, wildlife and human populations. In contrast, the Toronto and Region Area of Concern is situated in the most densely populated area in Canada and continues to face a wide range of environmental challenges from rapid urbanization.

Remedial Action Plans

In each Area of Concern, government, community and industry partners are cooperating to address environmental challenges through the development and implementation of remedial action plans. Environment Canada and the Ontario Ministry of the Environment coordinate remedial action plans for all Areas of Concern in Canada, under the Canada–Ontario Agreement Respecting the Great Lakes Basin Ecosystem.

Remedial action plans are developed and implemented in collaboration with local partners that include local residents, community groups, Aboriginal communities, industry, various federal, provincial departments and municipal governments in an open and transparent manner. Remedial action plans proceed through three stages:

- Stage 1: assessment of the severity and identification of the underlying causes of environmental degradation that are the basis for the location being designated an Area of Concern;
- Stage 2: development and implementation of remedial actions to restore, protect and monitor environmental quality and beneficial uses; and
- Stage 3: confirmation, through monitoring, that the beneficial use impairments have been addressed successfully through the remedial actions.


At the end of Stage 3, after all remedial actions have been completed and when up to three years of monitoring confirm that water quality and ecosystem health (i.e., the beneficial uses) have been restored, an Area of Concern is delisted. Delisting an area means that the goals or delisting criteria leading to the restoration of environmental quality identified in the remedial action plan have been achieved. Delisting criteria are measurable environmental conditions that must be met for the beneficial use impairment in order to conclude that it has been addressed. Delisting is done by the Government of Canada in consultation with the Province of Ontario and local Remedial Action Plan partners and with concurrence from the International Joint Commission.

In the event that additional time is required for recovery of beneficial uses of the environment following completion of remedial actions, Areas of Concern may be given the interim designation of *Area in Recovery*.

As remedial actions are implemented, the status of the particular beneficial use impairment may shift from *impaired* or *requires further assessment* to *not impaired*. Table 1 summarizes the status of these 14 environmental challenges in the 14 Canadian and binational Areas of Concern and the recently delisted Wheatley Harbour Area of Concern. The individual progress reports provide more details on the environmental challenges in each Area of Concern.

Progress on Environmental Challenges

The federal and provincial governments and partners have made considerable progress in addressing environmental challenges in Areas of Concern. Much

Table 1: Status of Beneficial Use Impairments in the Canadian Areas of Concern

Beneficial Use Impairments (as identified in the Great Lakes Water Quality Agreement) – September 2010														
AREA OF CONCERN	1 Restrictions on fish and wildlife consumption	2 Tainting of fish and wildlife flavour	3 Degradation of fish and wildlife populations	4 Fish tumours or other deformities	5 Bird or animal deformities or reproduction problems	6 Degradation of benthos	7 Restrictions on dredging activities	8 Eutrophication or undesirable algae	9 Restrictions on drinking water consumption, or taste and odour problems	10 Beach closings	11 Degradation of aesthetics	12 Added costs to agriculture or industry	13 Degradation of phytoplankton or zooplankton populations	14 Loss of fish and wildlife habitat
Bay of Quinte	⊙													
Detroit River	⊙													
Hamilton Harbour														
Jackfish Bay			⊙											
Niagara River	⊙ ▲													
Nipigon Bay														
Peninsula Harbour			⊙											
Port Hope Harbour														
Spanish Harbour														
St. Clair River														
St. Lawrence River	⊙													
St. Marys River	⊙													
Thunder Bay														
Toronto and Region														
Wheatley Harbour														

Impaired
Not Impaired
⊙ for fish
Requires Further Assessment
Change in status from "Impaired" or "Requires Further Assessment" to "Not Impaired"
▲ for wildlife



effort has been invested in actions that directly support the restoration and protection of environmental quality and beneficial uses. These initiatives include

- Reducing municipal wastewater and stormwater pollution;
- Encouraging beneficial management practices to reduce pollution from rural areas;
- Developing contaminated sediment management strategies;
- Restoring and protecting fish and wildlife habitats and populations;
- Fostering community participation; and
- Increasing knowledge through research, monitoring and reporting.

Looking ahead, contaminated sediment and municipal wastewater continue to be key challenges, and Canada and Ontario will continue to identify these issues as priorities for achieving goals to restore all of the Great Lakes Areas of Concern.

2010 Status Reports

The 15 **Status of Beneficial Use Impairment Reports** have been prepared jointly by Environment Canada and the Ontario Ministry of the Environment, with the assistance of local remedial action plan public advisory or implementation committees, to report progress to the International Joint Commission. Each status report

- provides background information on the environmental conditions and concerns in the area that led to its designation as an Area of Concern;
- identifies the partner agencies and organizations actively involved in the development and implementation of the remedial action plan;
- identifies the status of the remedial action plan with respect to the three stages of development and implementation;
- highlights key accomplishments and outlines the prospects for eventual delisting of the area of Concern; and
- summarizes, for each beneficial use impairment identified through the remedial action plan process, its current status, key actions undertaken to date by various partner agencies and organizations, as well as future key actions planned by the partners as they work towards the full restoration of environmental quality.

The status reports have been prepared based on the latest available scientific data and input from the local Remedial Action Plan partners, as of September 2010.

For More Information

Environment Canada's Great Lakes Areas of Concern Program Website:
www.ec.gc.ca/raps-pas

Ontario Ministry of the Environment:
www.ontario.ca/environment

Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem:
www.ec.gc.ca/grandslacs-greatlakes/default.asp?lang=En&n=B903EE0D-1

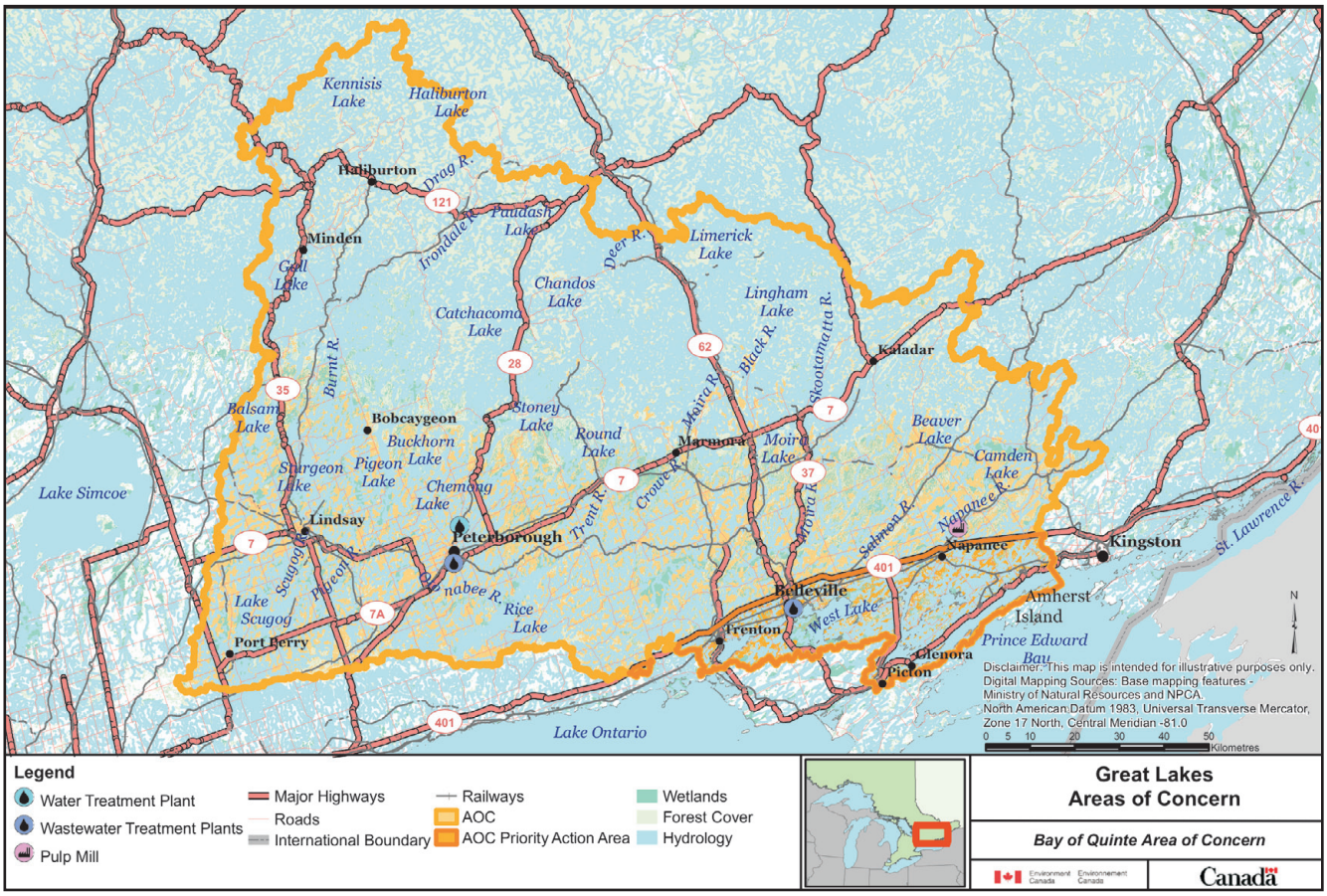
Great Lakes Water Quality Agreement:
www.ec.gc.ca/grandslacs-greatlakes/default.asp?lang=En&n=88A2F0E3-1

International Joint Commission:
www.ijc.org

Bay of Quinte
Area of Concern
Status of Beneficial Use Impairments
September 2010

The Bay of Quinte is a narrow inlet, about 100 km in length, on the north shore of Lake Ontario near the eastern outlet of the lake. The Area of Concern encompasses the bay and its 18 000 km^2 (1.8 million ha) drainage basin. The watershed includes the generally agricultural Prince Edward County on the south side of the bay and extends as far north as Algonquin Park. The Trent River is responsible for most of the flow through the bay. The shoreline of the bay includes 19 provincially significant wetlands. About 400 000 people live in the area, with the population around the bay concentrated in the cities of Trenton and Belleville, the towns of Napanee, Picton and Deseronto, and the Mohawk Tyendinaga Territory.

Environmental concerns in the Bay of Quinte Area of Concern have focused on excess nutrients, persistent toxic contamination, bacterial contamination and the loss or destruction of fish and wildlife habitat.



Ontario

Canada

PARTNERSHIPS IN ENVIRONMENTAL PROTECTION

The Bay of Quinte was designated an Area of Concern in 1987 under the Canada–United States Great Lakes Water Quality Agreement. Areas of Concern are sites on the Great Lakes system where environmental quality is significantly degraded and beneficial uses are impaired. Currently, there are 9 such designated areas on the Canadian side of the Great Lakes, 25 in the United States, and 5 that are shared by both countries. In each Area of Concern, government, community and industry partners are undertaking a coordinated effort to restore environmental quality and beneficial uses through a remedial action plan.

Remedial Action Plan Partners

Environment Canada and the Ontario Ministry of the Environment coordinate the development and implementation of the remedial action plans to protect and restore these Areas of Concern in Canada. Since 1997, implementation of recommended actions for the Bay of Quinte Area of Concern has been facilitated by members of the Bay of Quinte Restoration Council. The Restoration Council is co-chaired by Lower Trent Region Conservation and Quinte Conservation. Other members of the Council, in addition to Environment Canada and the Ontario Ministry of the Environment, are (in alphabetical order) the Department of National Defence, Fisheries and Oceans Canada, the Mohawks of the Bay of Quinte, the Ontario Ministry of Agriculture, Food and Rural Affairs, the Ontario Ministry of Natural Resources and Quinte Watershed Cleanup Inc.

Remedial Action Plan Process

The Great Lakes Water Quality Agreement requires that remedial action plans be developed and implemented in three stages:

Stage 1: Identifying the Environmental Challenges

In Stage 1, the governments of Canada and Ontario, working with community stakeholders, undertook an extensive program of research and monitoring to assess environmental quality and identify the causes of degradation in the Area of Concern. The ***Stage 1 Remedial Action Plan Report***, summarizing the outcome of these efforts, was completed in 1990. The report identified 10 environmental challenges needing to be addressed and known as *beneficial use impairments* in the Remedial Action Plan process. Their current status is described below in **Progress on Environmental Challenges**.

Stage 2: Planning and Implementing Remedial Actions

In Stage 2, the governments of Canada and Ontario, working with community stakeholders, undertook a detailed review of potential remedial actions to restore, protect and monitor environmental quality in the Area of Concern. The ***Stage 2 Remedial Action Plan Report***, which identified 80 recommended actions, was completed in 1993. An updated work plan, identifying the remaining priority actions to be undertaken, was developed for 2006–2011.

Stage 3: Monitoring Actions and Delisting of the Area of Concern

The ***Stage 3 Remedial Action Plan Report*** and delisting of the Bay of Quinte as an Area of Concern will take place when monitoring confirms that the environmental challenges have been addressed successfully through the remedial actions. The target date for completion of the recommended remedial actions is 2013.

PROGRESS ON ENVIRONMENTAL CHALLENGES

The federal and provincial governments and partners have made considerable progress in addressing environmental challenges in the Bay of Quinte Area of Concern. Direct discharges of industrial wastes have been substantially lowered. Beach closings occur less frequently. Over 27 000 ha of farmland have been converted from conventional to conservation tillage, and phosphorus inputs from rural sources have been lowered at source by more that 16 000 kg annually. At sewage treatment plants bordering directly on the Bay of Quinte, phosphorus loads have been greatly reduced as a result of sewage treatment plant optimization for 4 facilities within the watershed. Over 40 km of shoreline have been planted with native trees, shrubs and grasses to reduce erosion and improve habitats. Important wetlands and shoreline resources have been mapped. Over 800 ha of wetland have been either rehabilitated or protected. The numbers of nearshore and open water fish, coastal wetland fish, amphibians and marsh breeding birds are now present in numbers consistent with a stable, diverse and healthy aquatic ecosystem.

Looking ahead, further work is required to develop and implement a long-term phosphorus management strategy to ensure protection of the bay into the future from excess nutrient loading. The partners also will need to monitor the effects of the various remedial actions on the area's water quality and fish and wildlife habitat.

Status of Beneficial Use Impairments

The tables below summarize, for each of the 10 beneficial use impairments for the Bay of Quinte Area of Concern, their status as of September 2010; key actions taken by various partner agencies and organizations under the Remedial Action Plan; and future key actions planned by the partners as they work towards the full restoration of environmental quality and eventual delisting of the Area of Concern. Several of the beneficial use impairments identified below are currently undergoing a status reassessment, so even if the status is currently identified as *impaired*, the environmental data may support a change in status to *not impaired*.

Status – IMPAIRED

Beach Closings

Status: ***Impaired***

Beaches are closed as a result of high levels of *E. coli* that pose a risk to human health. Recent monitoring has shown that Bay of Quinte beaches included in the current Remedial Action Plan targets were not posted for more than 20% of the swimming season, except where influenced by heavy rainfall events. Additional data is currently being collected to confirm this finding.

KEY ACTIONS

COMPLETED	REMAINING
▪ Conducted Clean Up Rural Beaches outreach program to reduce phosphorous loadings to the bay by 16 500 kg a year and sediment loadings by 12 000 t a year; these actions helped reduce bacterial contamination in the Bay of Quinte ▪ Completed increased monitoring by regional health units of bacteria at active beaches ▪ Initiated a 2-year study of water quality in open water and recreational areas to assess compliance with delisting criteria (2009)	▪ Review delisting criteria and supporting scientific evidence for changing status from *impaired* to *not impaired* ▪ Collaborate with Bay of Quinte area municipalities on the implementation of pollution prevention and control plans to reduce quantity and improve quality of stormwater runoff from municipal sources ▪ Continue monitoring and source tracking studies at active beaches and open water and recreational areas ▪ Complete sewage treatment plant upgrades in Picton, Deseronto and Napanee ▪ Work with City of Belleville on wet weather flow issues at the Belleville sewage treatment plant

Degradation of Aesthetics

Status: ***Impaired***

Aesthetics are degraded as a result of the presence of periodic and localized algal blooms. Long-term monitoring of aesthetics at open-water locations in the bay has shown great improvement in overall water clarity.

KEY ACTIONS

COMPLETED	REMAINING
▪ Implemented federal pulp and paper regulations and the provincial Municipal/ Industrial Strategy for Abatement (MISA) regulations in the mid-1990s, which eliminated persistent toxic substances and addressed other problems associated with industrial discharges entering the Bay of Quinte ▪ Reduced discharges of nutrients through implementation of phosphorus loading limits on Bay of Quinte area sewage treatment plants ▪ Monitored aesthetics using algal species and biomass to determine frequency, duration and severity of algal blooms	▪ Assess new targets and measures ▪ Collaborate with Bay of Quinte area municipalities on implementation of pollution prevention and control plans to reduce quantity and improve quality of stormwater runoff from municipal sources ▪ Develop and implement a long-term phosphorous management strategy for the Bay of Quinte

Degradation of Benthos[1]

Status: ***Impaired***

Benthic communities are degraded as a result of excess nutrients (phosphorus), habitat alteration, invasive species (particularly Zebra Mussels) and contamination from toxic substances. Long-term monitoring demonstrates that the targets for benthic communities have been met.

KEY ACTIONS

COMPLETED	REMAINING
▪ Completed annual benthic community surveys at open water locations in the bay, which showed a relatively healthy benthic community composition and structure ▪ Conducted studies on benthic communities and sediment toxicity, including a risk assessment for the Deloro/Moira River (2001) and a compilation and analysis of past contaminant studies for the Trent River (2005) ▪ Completed a study on historic benthic and toxicity studies that demonstrated that the overall benthic community was not impaired by toxic contamination (2007) ▪ Completed detailed risk assessment for the lower Trent River, which demonstrated no ecological or human health risk and therefore no justification for remediation of sediment at the mouth of the Trent River at this time (2007) ▪ Developed and implemented phosphorous control and management initiatives to reduce impacts on benthic communities	▪ Review delisting criteria and supporting scientific evidence for changing status from *impaired* to *not impaired*

[1] *Benthos* and *benthic community* refer to the invertebrate organisms, such as worms, nymphs and insect larvae, which dwell for all or part of their lives in the bottom sediments of lakes and rivers. Scientists often use the health and abundance of these organisms as indicators of contaminant toxicity and ecosystem health.

Degradation of Fish and Wildlife Populations

Status: ***Impaired***

Fish and wildlife populations are primarily impaired by the loss and destruction of habitat (wetlands, nearshore, and shoreline areas). Based on long-term and recent surveys, the following communities likely are not impaired: nearshore and open water fish, coastal wetland fish, amphibians and marsh breeding birds. Additional data and confirmation of delisting criteria are required.

KEY ACTIONS

COMPLETED	REMAINING
▪ Implemented federal pulp and paper regulations and the provincial Municipal/ Industrial Strategy for Abatement (MISA) regulations ▪ Reduced discharges of nutrients through implementation of phosphorus loading limits on bay area sewage treatment plants ▪ Implemented the Habitat Enhancement Program ▪ Completed Fisheries Management Plan and Fish and Wildlife Habitat Management Plans ▪ Completed Natural Heritage Reports and/or Strategies for Trent Hills, Quinte West, Belleville, Tyendinaga Mohawk Territory and Greater Napanee	▪ Review delisting criteria and supporting scientific evidence for changing status from *impaired* to *not impaired* ▪ Continue Habitat Enhancement Program, implement the Fisheries Management Plan and Fish and Wildlife Habitat Management Plans

Degradation of Phytoplankton and Zooplankton[2] Populations

Status: ***Impaired***

Phytoplankton and zooplankton communities are impaired by impacts to the bay ecosystem. Long-term surveys have shown changes in community composition, particularly an increase in the proportion of blue-green algae that is associated with taste, odour and toxin impairments.

KEY ACTIONS

COMPLETED	REMAINING
▪ Implemented federal pulp and paper regulations and the provincial Municipal/ Industrial Strategy for Abatement (MISA) regulations ▪ Reduced discharges of nutrients through implementation of phosphorus loading limits by Bay of Quinte area sewage treatment plants ▪ Undertook monitoring programs measuring algal species, populations, biomass, and community composition	▪ Review delisting criteria and supporting scientific evidence for changing status from *impaired* to *not impaired* ▪ Collaborate with Bay of Quinte area municipalities on implementation of pollution prevention and control plans and master drainage plans, and on upgrades to sewage treatment plants ▪ Develop and implement the long-term Phosphorous Management Strategy for the Bay of Quinte

[2] *Phytoplankton* and *zooplankton* are the collection of small or microscopic water-borne plant and animal organisms (respectively) that float or drift in great numbers, especially at or near the water's surface, and that serve as food for fish and other larger organisms.

Eutrophication[3] or Undesirable Algae

Status: ***Impaired***

Phosphorus inputs from rural sources have been lowered at source by more than 16 000 kg annually. At sewage treatment plants bordering directly on the Bay of Quinte, phosphorus loads have been greatly reduced, from approximately 215 kg/day to the current load of approximately 15 kg/day, as a result of sewage treatment plant optimization. Within the Bay of Quinte waters, phosphorus concentrations are approaching the Bay of Quinte RAP target of 40 µg/L. Water clarity is improving and the algal blooms are less severe. However, localized eutrophication exists and nuisance algal blooms have been reported.

KEY ACTIONS

COMPLETED	REMAINING
▪ Implemented federal pulp and paper regulations and the provincial Municipal/ Industrial Strategy for Abatement (MISA) regulations ▪ Reduced discharges of nutrients through implementation of phosphorus loading limits on bay area sewage treatment plants ▪ Conducted Clean Up Rural Beaches outreach program to reduce phosphorous loadings to the bay by 16 500 kg a year and sediment loadings by 12 000 t a year ▪ Completed nutrient budget and developed phosphorus model to determine appropriate loadings ▪ Completed studies of upgrades for municipal sewage treatment plants and pollution prevention and control plans for Quinte West and Belleville	▪ Develop and implement the long-term Phosphorous Management Strategy for the Bay of Quinte ▪ Update or complete municipal pollution prevention and control plans, Implement master drainage planning, complete upgrades to municipal sewage treatment plants

Loss of Fish and Wildlife Habitat

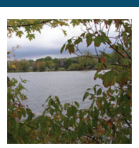
Status: ***Impaired***

Based on recent surveys, coastal wetland habitat in the bay is relatively healthy as indicated by unimpaired submerged aquatic vegetation and aquatic invertebrate communities. Coastal wetland water quality requires further assessment through ongoing data collection.

KEY ACTIONS

COMPLETED	REMAINING
▪ Implemented the Habitat Enhancement Program: planted native trees, shrubs and grasses along 40 km of shoreline; rehabilitated or protected 800 ha of wetlands; carried out public outreach and education programs on shoreline protection and restoration ▪ Completed natural heritage reports or strategies for Trent Hills, Quinte West, Belleville, Tyendinaga Mohawk Territory and Greater Napanee ▪ Completed the Fish and Wildlife Habitat Management Plans and the Fisheries Management Plan	▪ Review delisting criteria and supporting scientific evidence for changing status from *impaired* to *not impaired* ▪ Continue the Habitat Enhancement Program ▪ Implement the Fisheries Management Plan and Fish and Wildlife Habitat Management Plans ▪ Complete the Natural Heritage Strategy for Prince Edward County ▪ Align or incorporate natural heritage strategies, fisheries, and fish and wildlife management plans into municipal official plans

[3] *Eutrophication* (or *eutrophic conditions*) is the process by which lakes and other water bodies are enriched by nutrients (usually phosphorus and nitrogen), which leads to excessive plant growth and oxygen depletion.



Restrictions on Drinking Water Consumption, or Taste and Odour Problems

Status: ***Impaired***

Drinking water systems regulated under the *Safe Drinking Water Act* are providing drinking water of a quality that meets the Ontario Drinking Water Quality Standards. However, levels of toxins produced by cyanobacteria (blue-green algae) have been detected above drinking water standards in raw water sources, and aesthetic taste and odour issues associated with algae have also been reported. Additional data and confirmation of delisting criteria are required.

KEY ACTIONS

COMPLETED	REMAINING
▪ Carried out surface water sampling to determine levels and dynamics of microcystins and taste and odour organic compounds ▪ Completed studies on drinking water taste and odour, and on toxic compounds in Bay of Quinte surface water ▪ Implemented the provincial Drinking Water Surveillance Program (DWSP) ▪ Implemented the *Safe Drinking Water Act*, *Nutrient Management Act* and the *Clean Water Act*	▪ Assess new targets and measures ▪ Continue to carry out surface water sampling to determine levels and dynamics of microcystins and taste and odour organic compounds ▪ Continue to implement the Drinking Water Surveillance Program ▪ Update or complete municipal pollution prevention and control plans ▪ Implement master drainage planning and complete upgrades to municipal sewage treatment plants ▪ Develop and implement a long-term Phosphorous Management Strategy for the Bay of Quinte

Restrictions on Fish and Wildlife Consumption

Status: ***Impaired, for fish consumption***

Fish consumption restrictions for the bay as a whole are the same or lower than non-impacted or control sites. However, recent studies identified two contaminant hot spots in the bay that resulted in more restrictive consumption advisories for adult yellow perch and brown bullhead due to elevated levels of PCBs,[4] dioxin-like PCBs, mercury, dioxins and furans. Actions are currently being implemented to address sources in the identified areas.

KEY ACTIONS

COMPLETED	REMAINING
▪ Implemented federal pulp and paper regulations and the provincial Municipal/ Industrial Strategy for Abatement (MISA) regulations ▪ Undertook a human health risk assessment that concluded that there were no predicted effects on human recreational users from eating fish of the lower Trent River, provided they followed the restrictions in the annual *Guide to Eating Ontario Sport Fish* (2006) ▪ Completed detailed ecological risk assessment for the lower Trent River; determined that there was no justification for remediation of sediment at the mouth of the Trent River at this time ▪ Completed statistical analysis of 30 plus years of contaminant data collected through the provincial sports fish monitoring program	▪ Review delisting criteria and supporting scientific evidence for changing status from *impaired* to *not impaired* ▪ Continue with provincial sports fish monitoring program ▪ Continue to implement actions to address identified local hot spots

[4] *Polychlorinated biphenyls* (PCBs) are synthetic chemicals that have wide industrial applications. The manufacturing and importing of PCBs were banned in North America in 1977. PCBs are very persistent (long-lasting) in the environment and can be transported over long distances.

Status – REQUIRES FURTHER ASSESSMENT

Fish Tumours or Other Deformities

Status: ***Requires further assessment***

Fish tumours and other deformities are linked to multiple contaminants and other factors that contribute to abnormal growth of fish tissue and organs; there will be no impairment when the incidence rate of fish tumours or other deformities in Brown Bullhead does not exceed rates found at Lake Ontario reference sites.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Completed tumour assessments	▪ Change status of beneficial use impairment to *not impaired*

FOR MORE INFORMATION

Environment Canada:
www.ec.gc.ca/raps-pas

Bay of Quinte Remedial Action Plan:
www.bqrap.ca

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Aussi disponible en français

Detroit River
Area of Concern
Canadian Section
Status of Beneficial Use Impairments
September 2010

The Detroit River is a major navigation corridor of the Great Lakes, extending 51 km from Lake St. Clair to Lake Erie. Its watershed, which covers about 2000 km^2 (200 000 ha) on both sides of the international boundary, is home to more than five million people. The major population centres in the area are the cities of Detroit, Michigan, one of the busiest ports in the Great Lakes, and Windsor, Ontario.

For decades, the watershed of the Detroit River Area of Concern has been subject to extensive industrial activity, agricultural practices and urban development. Nearly 100 communities rely on the river as a source of drinking water, and 76 industries and 10 municipalities discharge wastewater into the river or its tributaries. As a result of this extensive development, the Detroit River is the single largest source of contaminants released to Lake Erie. Combined sewer overflows, sanitary sewer overflows and municipal and industrial discharges are major sources of contaminants. Other sources of contaminants include stormwater runoff into tributaries in Michigan within the watershed and runoff and discharges from sites on both sides of the border upstream of the river.

Ontario

Canada

PARTNERSHIPS IN ENVIRONMENTAL PROTECTION

The Detroit River was designated an Area of Concern in 1987 under the Canada–United States Great Lakes Water Quality Agreement. Areas of Concern are sites on the Great Lakes system where environmental quality is significantly degraded and beneficial uses are impaired. Currently, there are 9 such designated areas on the Canadian side of the Great Lakes, 25 in the United States, and 5 (including the Detroit River) that are shared by both countries. In each Area of Concern, government, community and industry partners are undertaking a coordinated effort to restore environmental quality and beneficial uses through a remedial action plan.

Remedial Action Plan Partners

Responsibility for the Detroit River Area of Concern is shared jointly by both Canada and the United States. In 1998, Environment Canada, the U.S. Environmental Protection Agency, the Ontario Ministry of the Environment and the Michigan Department of Environmental Quality (now the Department of Natural Resources and Environment) signed the Four Agency Letter of Commitment. The letter outlined agency roles and responsibilities during implementation of the remedial action plans for three binational Areas of Concern—the Detroit River, St. Clair River and St. Marys River.

Since 1998, the Detroit River Canadian Cleanup (DRCC) has served as the implementation group for the Canadian side of the Detroit River Area of Concern. The group, led by the Ontario Ministry of the Environment and Environment Canada, includes (in alphabetical order) representatives from the City of Windsor, the Essex County Stewardship Network, the Essex Region Conservation Authority, the Ontario Ministry of Natural Resources, the towns of Amherstburg and LaSalle, and the University of Windsor Great Lakes Institute for Environmental Research. Industry and several non-governmental organizations, including the Citizens Environment Alliance and the Essex County Field Naturalists Club, also have been involved in the implementation effort.

Remedial Action Plan Process

The Great Lakes Water Quality Agreement requires that remedial action plans be developed and implemented in three stages:

Stage 1: Identifying the Environmental Challenges

In Stage 1, the governments of Canada, Ontario, the United States and the State of Michigan, working with community stakeholders, undertook an extensive program of research and monitoring to assess environmental quality and identify the causes of degradation in the Area of Concern. The ***Stage 1 Remedial Action Plan Report***, summarizing the outcome of these efforts, was completed in 1991. The report identified eight environmental challenges needing to be addressed and known as *beneficial use impairments* in the remedial action plan process.

Stage 2: Planning and Implementing Remedial Actions

In Stage 2, the governments of Canada and Ontario, working with the Detroit River Canadian Cleanup and community stakeholders, undertook a detailed consideration of potential remedial actions to restore, protect and monitor environmental quality in the Area of Concern. The draft binational ***Stage 2 Remedial Action Plan Report***, which identified recommended remedial actions, was started in 1996, but never finalized and approved. The ***Stage 2 Remedial Action Plan Report***, addressing only the Canadian side of the Area of Concern, was made available for public review and comment in late 2009. The report is to be finalized in 2010. The research required to develop these reports has provided evidence to re-designate the status of some of the beneficial uses. As a result, the ***Detroit River Canadian Stage 2 Remedial Action Plan Report*** proposes a total of 11 beneficial use impairments. Their current status is described below in **Progress on Environmental Challenges**.

Stage 3: Monitoring Actions and Delisting of the Area of Concern

The ***Stage 3 Remedial Action Plan Report*** and delisting of Detroit River as an Area of Concern will take place when monitoring confirms that the environmental challenges have been addressed successfully through the remedial actions. Completion of all priority actions is targeted for 2015. As of September 2010, there is no estimate of when the Detroit River will be delisted as an Area of Concern.

PROGRESS ON ENVIRONMENTAL CHALLENGES

The federal and provincial governments and partners have made significant progress in addressing environmental challenges in the Area of Concern. In addition to the specific actions summarized in the tables below, the partners have carried out a number of important actions that have addressed more than one environmental challenge. These cross-cutting initiatives have included implementing conservation tillage techniques on more than 15 000 ha of agricultural lands to reduce the runoff of nutrients, sediments and chemicals into local waterways; successful spawning of threatened or endangered fish species (Lake Sturgeon, Lake Whitefish, Walleye and Northern Madtom) through fish habitat creation at Fighting Island; and completing the final design of the City of Windsor's retention treatment basin, estimated at $60 million, to reduce and treat combined sewer overflows and so reduce the discharge of pollutants into the Detroit River.

The major challenges remaining on the Canadian side include the construction of the City of Windsor's retention treatment basin (currently underway), which will eliminate 22 combined sewer overflows along the Windsor riverfront; the upgrade of the Amherstburg wastewater treatment plant (currently underway); and habitat restoration, with a focus on protecting and rehabilitating coastal wetlands, constructing fish spawning habitat, and carrying out shoreline naturalization projects. There also is a need for continued monitoring to track progress and better understand the causes of environmental degradation in the area. The ***Stage 2 Remedial Action Plan Report*** will guide future implementation, monitoring and public engagement efforts in the Canadian side of the Area of Concern.

Status of Beneficial Use Impairments

The tables below summarize, for each of the 11 beneficial use impairments in the Detroit River Area of Concern (Canadian section), their status as of September 2010; key actions taken by various partner agencies and organizations under the Remedial Action Plan; and future key actions planned by the partners as they work towards the full restoration of environmental quality and eventual delisting of the Area of Concern.

Status – IMPAIRED

Beach Closings

Status: ***Impaired***

There are excessive posted advisories warning that bacterial levels (*E. coli*) exceed safe levels for swimming. In Ontario, provincial standards for *E. coli* were exceeded downstream of Little River, Turkey Creek and the Amherstburg wastewater treatment plant.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Reduced pollution from domestic sewage through $110 million expansion and upgrade of the municipal wastewater treatment plant in Windsor ▪ Conducted beach monitoring at upstream and downstream beaches ▪ Conducted *E. coli* survey on both sides of the river (2008)	▪ Initiate monitoring of swimming areas within the Detroit River and compare to the beaches already being monitored upstream and downstream ▪ Complete the construction of the Windsor retention treatment basin, which will eliminate 22 combined sewer overflows along the Windsor waterfront ▪ Complete the upgrade of the Amherstburg wastewater treatment plant

Bird (or Other Animal) Deformities or Reproduction Problems

Status: ***Impaired***

Although there has been a reduction in the severity of reproductive problems since the 1960s and 1970s, there is evidence that populations still are being affected to some degree. Bird or other animal deformities are not an issue.

KEY ACTIONS

COMPLETED	REMAINING

▪ Investigated impacts on reproductive viability of
  • Herring Gulls on Fighting Island
  • Black Crowned Night Herons in the Detroit River
  • Frog populations in Detroit River coastal wetlands
  • Snapping Turtles
▪ Conducted annual monitoring of Bald Eagle nesting
▪ Carried out remediation of contaminated sediments at Turkey Creek (Ontario)
	▪ Complete frog population assessments in 2010
	▪ Continue study to assess the reproductive viability of Black Crowned Night Herons

Degradation of Aesthetics

Status: ***Impaired***

Aesthetics are impaired due to combined sewer overflows discharges, but these effects are not persistent. Numerous spills of various materials have been noted, but generally are more of an issue on the United States side of the Area of Concern.

KEY ACTIONS

COMPLETED	REMAINING
▪ Reduced pollution from domestic sewage through $110 million expansion and upgrade of the municipal wastewater treatment plant in Windsor ▪ Conducted surveys of impacts on aesthetics (1999 and 2000)	▪ Conduct aesthetics survey on the Canadian side of the river in 2010 ▪ Complete the construction of the Windsor retention treatment basin, which will eliminate 22 combined sewer overflows along the Windsor riverfront

Degradation of Benthos[1]

Status: ***Impaired***

Benthic communities are severely degraded along Michigan's Trenton Channel, but considerably better mid-river. Community structure along the Ontario shoreline is more balanced.

KEY ACTIONS

COMPLETED	REMAINING
▪ Conducted riverwide assessments of benthic invertebrate community (1991, 1999, 2004)	▪ Complete follow-up assessments of benthic invertebrate community

[1] *Benthos* and *benthic community* refer to the invertebrate organisms, such as worms, nymphs and insect larvae that dwell for all or part of their lives in the bottom sediments of lakes and rivers. Scientists often use the health and abundance of these organisms as indicators of contaminant toxicity and ecosystem health.

Degradation of Fish and Wildlife Populations

Status: ***Impaired***

Impairment identified as a result of loss of coastal wetland habitat, shoreline hardening, loss of fish spawning habitat, and contaminants in sediments that are particularly toxic to young fish.

KEY ACTIONS

COMPLETED	REMAINING
▪ Implemented the provincial Municipal/Industrial Strategy for Abatement (MISA) regulations in the mid-1990s, which eliminated persistent toxic substances and addressed other problems associated with industrial discharges entering the Detroit River ▪ Implemented natural shoreline restoration projects to replace vertical sheet-pile walls and create habitat for fish and wildlife ▪ Created in-river fish spawning habitat at Fighting Island, Fort Malden, McKee Park and Riverfront Park; confirmed successful Lake Sturgeon spawning (2009) ▪ Undertook ongoing efforts to protect and rehabilitate coastal wetlands ▪ Conducted riverwide fish community assessment ▪ Undertook remediation of contaminated sediments at Turkey Creek (Ontario)	▪ Continue habitat restoration efforts in priority areas ▪ Continue monitoring of fish community to ensure recovery is maintained ▪ Complete revision of delisting criteria

Fish Tumours or Other Deformities

Status: ***Impaired***

Original designation due to elevated incidence of liver tumours in Bullhead, Walleye, Bowfin, Redhorse, and White Sucker species; levels comparable to other highly industrialized areas of the Great Lakes.

KEY ACTIONS

COMPLETED	REMAINING
▪ Conducted several studies of the incidence of tumours in various species	▪ Update status of this environmental challenge following analysis of data from 2006 Brown Bullhead samples

Loss of Fish and Wildlife Habitat

Status: ***Impaired***

Impairment due to the significant loss of coastal wetland habitat resulting from urban and industrial development along the shoreline of the Detroit River.

KEY ACTIONS

COMPLETED	REMAINING
▪ Undertook habitat restoration and non-point source remediation programs in the Area of Concern, beginning in the mid-1990s ▪ Implemented the provincial Municipal/Industrial Strategy for Abatement (MISA) regulations in the mid-1990s, which eliminated persistent toxic substances and addressed other problems associated with industrial discharges entering the Detroit River ▪ Implemented several large-scale natural shoreline protection projects in Windsor, LaSalle and Amherstburg ▪ Constructed Lake Sturgeon spawning habitat at Fighting Island ▪ Conducted assessments of coastal wetlands (2007, 2008)	▪ Continue to implement natural shoreline protection projects (e.g., Ranta Park, Brighton Beach) and in-river fish spawning habitat projects ▪ Determine how activities in the watershed affect the quality of the Detroit River

Restrictions on Dredging Activities

Status: ***Impaired***

On a site-specific basis, dredged sediments may be subject to disposal restrictions because of contaminants.

KEY ACTIONS

COMPLETED	REMAINING
▪ Undertook remediation of contaminated sediments at Turkey Creek (Ontario)	▪ Review the status of this beneficial use impairment

Restrictions on Fish and Wildlife Consumption

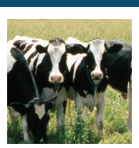
Status: ***Impaired***

Restricted consumption of fish is advised due to elevated levels of PCBs[2] and mercury in some fish species.

KEY ACTIONS

COMPLETED	REMAINING
▪ Confirmed that contaminated sediments in the lower United States reach of the river are the primary source of restrictions on consumption of fish and wildlife ▪ Undertook remediation of contaminated sediments at Turkey Creek (Ontario) ▪ Monitored sport fish and young-of-the-year fish ▪ Ensured findings on sediment contamination are better linked to fish consumption advisories	▪ Continue to monitor contaminants in sport fish in the Detroit River

[2] *Polychlorinated biphenyls* (PCBs) are synthetic chemicals that have wide industrial applications. The manufacturing and importing of PCBs were banned in North America in 1977. PCBs are very persistent (long-lasting) in the environment and can be transported over long distances.



Status – REQUIRES FURTHER ASSESSMENT

Degradation of Phytoplankton and Zooplankton[3] Populations

Status: ***Requires further assessment***

Limited data available to analyze and address this environmental challenge.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Implemented the provincial Municipal/Industrial Strategy for Abatement (MISA) regulations in the mid-1990s, which eliminated persistent toxic substances and addressed other problems associated with industrial discharges entering the Detroit River ▪ Conducted study on Detroit River plankton in 2008	▪ Complete final assessment to determine status

Tainting of Fish and Wildlife Flavour

Status: ***Requires further assessment***

This environmental challenge requires further assessment, given that past studies are inconclusive.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ No specific actions to date	▪ Conduct 2010 survey of anglers to provide more up-to-date comprehensive data and determine status

[3] *Phytoplankton* and *zooplankton* are the collection of small or microscopic water-borne plant and animal organisms (respectively) that float or drift in great numbers, especially at or near the water's surface, and that serve as food for fish and other larger organisms.

FOR MORE INFORMATION

Environment Canada:
www.ec.gc.ca/raps-pas

Detroit River Canadian Cleanup:
www.detroitriver.ca

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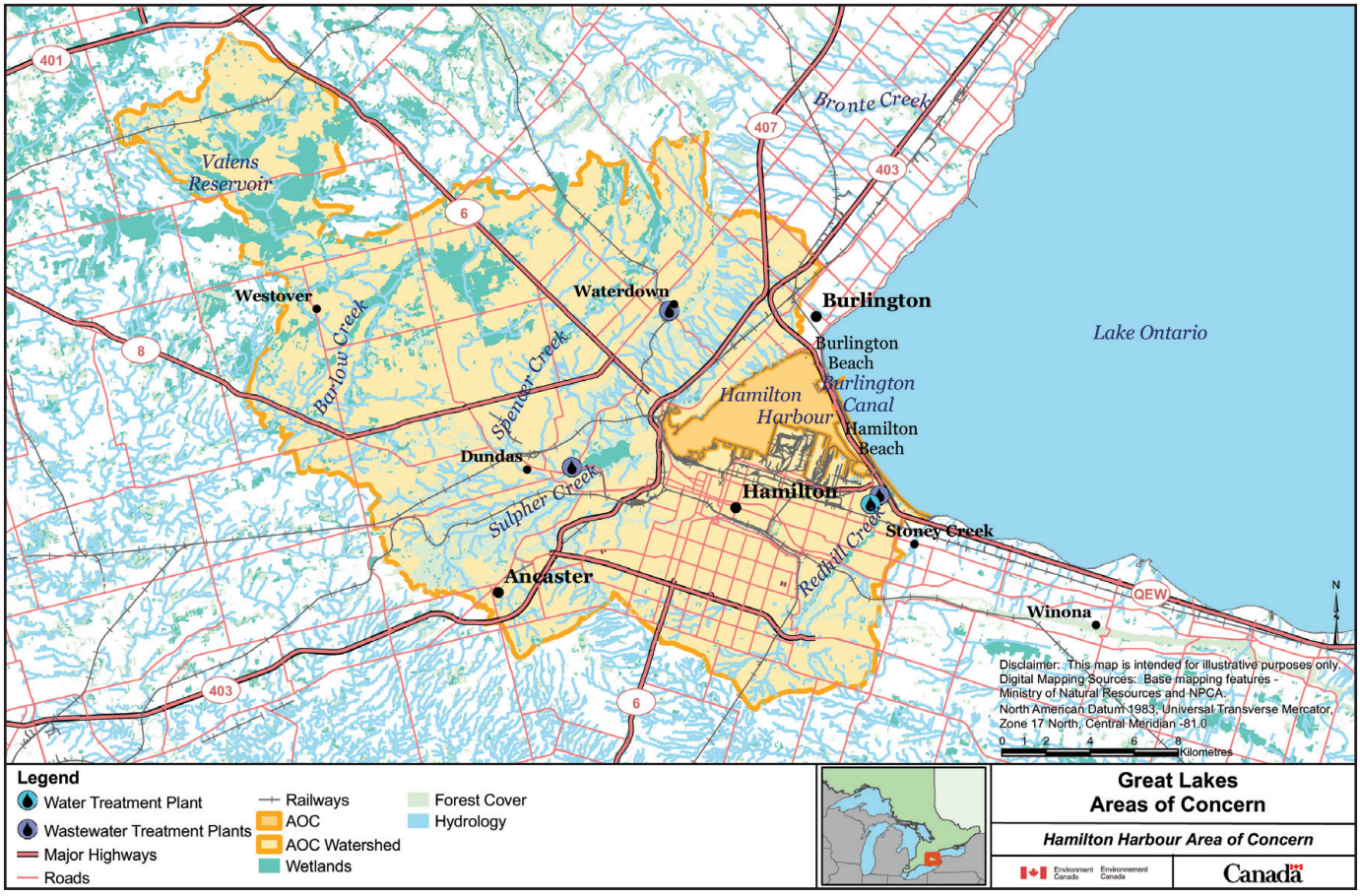
Hamilton Harbour
Area of Concern
Status of Beneficial Use Impairments
September 2010

Hamilton Harbour is a 2150-ha bay located at the western tip of Lake Ontario. The Area of Concern covers about 500 km^2 (50 000 ha) and includes the harbour, the Cootes Paradise wetland and open water, and the surrounding watershed drained by three main tributaries: Grindstone Creek, Red Hill Creek and Spencer Creek. The area population of nearly 700 000 is concentrated in the cities of Hamilton and Burlington, and portions of the Regional Municipality of Halton and the Township of Puslinch.

The Hamilton Harbour Area of Concern has been subject to the impacts of intensive industrial and urban development around its shores for many years. Historically, the economy of the region was based on the iron and steel industries. Today, Hamilton Harbour remains a major shipping centre, supporting one the largest concentrations of heavy industry in Canada. The harbour is the main recipient of four wastewater treatment plant discharges and urban runoff from the cities of Hamilton and Burlington. All these municipal and industrial point sources meet provincial standards; however, as the harbour is a contained water body in which water is retained for a long period of time, the impacts on the harbour's aquatic ecosystem, fish and wildlife continue to occur. The water quality of the



Ontario

Canada

harbour continues to be characterized by poor clarity, low oxygen levels and high nutrient levels resulting from a combination of soil erosion in the watershed, a large volume of treated urban sewage, urban runoff and combined sewer overflows. The water and sediments of the harbour are contaminated by metals, pesticides, PCBs[1] and PAHs.[2] In particular, the sediments of Randle Reef in the industrial port are highly contaminated with PAHs and other contaminants.

PARTNERSHIPS IN ENVIRONMENTAL PROTECTION

Hamilton Harbour was designated an Area of Concern in 1987 under the Canada–United States Great Lakes Water Quality Agreement. Areas of Concern are sites on the Great Lakes system where environmental quality is significantly degraded and beneficial uses are impaired. Currently, there are 9 such designated areas on the Canadian side of the Great Lakes, 25 in the United States, and 5 that are shared by both countries. In each Area of Concern, government, community and industry partners are undertaking a coordinated effort to restore environmental quality and beneficial uses through a remedial action plan.

Remedial Action Plan Partners

Environment Canada and the Ontario Ministry of the Environment coordinate the development and implementation of the remedial action plans to protect and restore these Areas of Concern in Canada. Other partners in the cooperative effort in the Hamilton Harbour Area of Concern include (in alphabetical order) ArcelorMittal Dofasco, the Bay Area Restoration Council, the City of Burlington, the City of Hamilton, Conservation Halton, Fisheries and Oceans Canada, the Hamilton Conservation Authority, the Hamilton Halton Home Builders' Association, the Hamilton Port Authority, the Hamilton Waterfront Trust, McMaster University, the Ontario Ministry of Natural Resources, the Regional Municipality of Halton, the Royal Botanical Gardens and U.S. Steel Canada (formerly Stelco).

Remedial Action Plan Process

The Great Lakes Water Quality Agreement requires that remedial action plans be developed and implemented in three stages:

Stage 1: Identifying the Environmental Challenges

In Stage 1, the governments of Canada and Ontario, working with community stakeholders, undertook an extensive program of research and monitoring to assess environmental quality and identify the causes of degradation in the Area of Concern. The ***Stage 1 Remedial Action Plan Report***, summarizing the outcome of these efforts, was completed in 1989 and updated in 1992. The report identified 11 environmental challenges needing to be addressed and known as *beneficial use impairments* in the Remedial Action Plan process. Their current status is described below in **Progress on Environmental Challenges**.

Stage 2: Planning and Implementing Remedial Actions

In Stage 2, the governments of Canada and Ontario, working with community stakeholders, undertook a detailed review of potential remedial actions to restore, protect and monitor environmental quality in the Area of Concern. The ***Stage 2 Remedial Action Plan Report***, which identified 50 recommended remedial actions, was completed in 1992. An updated report, identifying 57 recommendations expanding upon the original 50 recommendations, was completed in 2002. A work plan detailing tasks from 2006–2011 was completed in 2006. An update to the workplan is proposed for 2012–2015.

[1] *Polychlorinated biphenyls* (PCBs) are synthetic chemicals that have wide industrial applications. The manufacturing and importing of PCBs were banned in North America in 1977. PCBs are very persistent (long-lasting) in the environment and can be transported over long distances.

[2] *Polycyclic aromatic hydrocarbons* (PAHs) are chemical compounds found in oil, coal and tar deposits, and that also are produced as byproducts of fuel burning (whether fossil fuel or biomass). As pollutants, they are of concern because some compounds have been identified as carcinogenic.

Stage 3: Monitoring Actions and Delisting of the Area of Concern

The ***Stage 3 Remedial Action Plan Report*** and delisting of Hamilton Harbour as an Area of Concern will take place when monitoring confirms that the environmental challenges have been addressed successfully through the remedial actions. The target date for the completion of most remedial actions is 2015; however, as of September 2010, there is no estimate of when Hamilton Harbour will be delisted as an Area of Concern.

PROGRESS ON ENVIRONMENTAL CHALLENGES

The federal and provincial governments and partners have made considerable progress in addressing the environmental challenges identified through the remedial action plan process, particularly in the areas of water quality improvement and fish and wildlife habitat restoration. Many of the remaining environmental challenges affecting the harbour require significant capital costs. In particular, substantial resources are required for upgrades to wastewater treatment plants in Hamilton and Halton and the remediation of contaminated sediment at Randle Reef to meet Remedial Action Plan targets. In 2010, Canada and Ontario announced infrastructure funding for projects to upgrade the Woodward and Skyway wastewater treatment plants. The funds necessary to remediate the contaminated sediments at Randle Reef remain to be fully committed as of September 2010.

Status of Beneficial Use Impairments

The tables below summarize, for each of the 11 beneficial use impairments in the Hamilton Harbour Area of Concern, their status as of September 2010: key actions taken by various partner agencies and organizations under the remedial action plan; and future key actions planned by the partners as they work towards the full restoration of environmental quality and eventual delisting of the Area of Concern.

Status – IMPAIRED

Beach Closings

Status: ***Impaired***

There are numerous posted advisories that bacterial levels (*E. coli*) exceed safe levels for swimming and other body contact recreational activities at Bayfront Park Beach and Pier 4 Park Beach.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Constructed combined sewer overflow tanks to allow for initial opening of the beaches ▪ Conducted research that identified birds as the source of *E. coli* levels causing subsequent beach postings ▪ Carried out pilot bird management program at Pier 4 Park Beach to reduce impacts of birds on beaches	▪ Expand bird management and public education programs to promote cleaner beaches ▪ Investigate causes for cyanobacteria blooms (blue-green algae) that result in late summer and early fall beach closures

Degradation of Aesthetics

Status: ***Impaired***

Aesthetics are degraded as a result of the presence of oily sheens, debris, scum, poor water clarity and blue-green algal blooms.

KEY ACTIONS

COMPLETED	REMAINING
▪ Reduced amount of raw sewage and surface debris entering the harbour through the construction of combined sewer overflow tanks ▪ Reduced incidence and size of spills from industrial sites through implementation of pollution prevention plans	▪ Investigate causes of algal blooms that result in late summer and early fall beach closures ▪ Complete upgrades to wastewater treatment plants discharging into the harbour ▪ Continue the implementation of municipal stormwater management program

Degradation of Benthos[3]

Status: ***Impaired***

Monitoring has confirmed impairment of the benthic community structure within both the nearshore and deep water zones of Hamilton Harbour.

KEY ACTIONS

COMPLETED	REMAINING
▪ Carried out a range of stewardship actions resulting in cleaner sediment entering the harbour and improved monitoring of benthic conditions ▪ Completed initial upgrades to wastewater treatment plants discharging into the harbour	▪ Undertake sediment remediation projects at Randle Reef and the ArcelorMittal Dofasco boat slip

Degradation of Fish and Wildlife Populations

Status: ***Impaired***

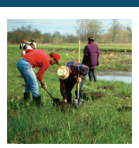
Impairment of colonial waterbirds and the fish populations has been identified as a result of the loss of 65 percent of Hamilton Harbour fish and wildlife habitat, eutrophication,[4] and contaminants.

KEY ACTIONS

COMPLETED	REMAINING
▪ Completed fisheries management plan	▪ Continue implementation of fisheries management plan and monitoring progress ▪ Maintain ongoing colonial waterbird management and monitoring efforts

[3] *Benthos* and *benthic community* refer to the invertebrate organisms, such as worms, nymphs and insect larvae that dwell for all or part of their lives in the bottom sediments of lakes and rivers. Scientists often use the health and abundance of these organisms as indicators of contaminant toxicity and ecosystem health.

[4] *Eutrophication* (or *eutrophic conditions*) is the process by which lakes and other water bodies are enriched by nutrients (usually phosphorus and nitrogen), which leads to excessive plant growth and oxygen depletion.



Eutrophication or Undesirable Algae

Status: ***Impaired***

Levels of phosphorus and ammonia remain elevated leading to the presence of undesirable and nuisance algae.

KEY ACTIONS

COMPLETED	REMAINING
▪ Met initial Remedial Action Plan water quality targets for Hamilton Harbour, through upgrades to the wastewater treatment plants discharging into the harbour ▪ Prepared a nutrient reduction strategy for the Cootes Paradise Marsh ▪ Initiated a harbour watershed stewardship program	▪ Complete upgrades to wastewater treatment plants to meet final water quality targets ▪ Implement strategy for addressing nutrient loading to Cootes Paradise Marsh

Loss of Fish and Wildlife Habitat

Status: ***Impaired***

Degradation of habitat, including the loss of 65% of Hamilton Harbour fish and wildlife habitat, has been identified as one of the causes resulting in the reduction or loss of colonial waterbirds and certain fish populations.

KEY ACTIONS

COMPLETED	REMAINING
▪ Restored 376 ha (of a projected 402 ha) of combined fish and wildlife habitat ▪ Restored 12 (of 16) km of shoreline habitat ▪ Initiated harbour watershed stewardship program	▪ Undertake proposed habitat restoration projects at Windermere Basin, Fishermen's Pier and North Shore, and complete ongoing restoration work at Cootes Paradise and Grindstone Creek ▪ Continue implementing the fisheries management plan ▪ Continue implementing the harbour watershed stewardship program

Restrictions on Dredging Activities

Status: ***Impaired***

Dredging of sediment from the navigational areas of Hamilton Harbour is restricted due to elevated levels of a variety of contaminants, including PCBs and PAHs.

KEY ACTIONS

COMPLETED	REMAINING
▪ Secured dredge sediment in approved confined disposal facility	▪ Identify and develop an alternate disposal location or method, given the limited capacity of the existing disposal facility

Restrictions on Fish and Wildlife Consumption

Status: ***Impaired***

Restricted consumption of 17 fish species is advised due to elevated levels of a variety of contaminants, including PCBs.

KEY ACTIONS

COMPLETED	REMAINING
▪ Implemented the provincial Municipal/Industrial Strategy for Abatement (MISA) regulations in the mid-1990s, which eliminated persistent toxic substances and addressed other problems associated with industrial discharges entering Hamilton Harbour ▪ Dredged Windermere Basin ▪ Ensured containment of municipal landfill leachate ▪ Updated sewer system bylaws and enhanced enforcement in both Halton and Hamilton ▪ Conducted a study of PCBs to better understand ongoing sources of PCBs in the food chain and identify remedial actions	▪ Implement the Randle Reef contaminated sediment remediation project ▪ Complete upgrades to Hamilton Harbour wastewater treatment plants

Status – REQUIRES FURTHER ASSESSMENT

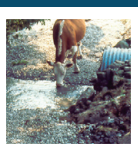
Bird (or Other Animal) Deformities or Reproduction Problems

Status: ***Requires further assessment***

Incidence rates of bird and animal deformities or reproductive problems in Herring Gulls and Snapping Turtles exceed background levels at suitable reference sites.

KEY ACTIONS

COMPLETED	REMAINING
▪ Conducted periodic monitoring of Herring Gull eggs in Hamilton Harbour and Snapping Turtles in Cootes Paradise	▪ Complete the assessment of wildlife monitoring data on health effects



Degradation of Phytoplankton and Zooplankton[5] Populations

Status: ***Requires further assessment***

Data require further assessment.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Initiated a study to determine status of this environmental challenge	▪ Complete the status study and continue to implement nutrient management program

Fish Tumours or Other Deformities

Status: ***Requires further assessment***

Data require further assessment.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Carried out studies of fish tumours in the Area of Concern	▪ Undertake additional surveys of Brown Bullheads to resolve the status of this environmental challenge

[5] *Phytoplankton* and *zooplankton* are the collection of small or microscopic water-borne plant and animal organisms (respectively) that float or drift in great numbers, especially at or near the water's surface, and that serve as food for fish and other larger organisms.

FOR MORE INFORMATION

Environment Canada:
www.ec.gc.ca/raps-pas

Hamilton Harbour Remedial Action Plan:
www.hamiltonharbour.ca/rap/index.htm

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Jackfish Bay
Area in Recovery
Status of Beneficial Use Impairments
September 2010

The Jackfish Bay Area of Concern is located on the north shore of Lake Superior, about 250 km northeast of Thunder Bay, Ontario. It consists of Jackfish, Moberly and Tunnel Bays, as well as a 14-km stretch of Blackbird Creek and two small lakes. The Town of Terrace Bay is the closest community. In the past, the bay supported small commercial Lake Trout and Whitefish fisheries. A local pulp mill is the largest industry and major employer in the area.

For many years, mill effluent, spills and sediment contamination impacted the waters and sediment in the Jackfish Bay Area of Concern, affecting fish and the benthic community.[1] Blackbird Creek, which flows into Jackfish Bay, has received wastewater discharge from the pulp mill since 1948. The two small lakes experienced significant infilling with wood fibre and other solids. In addition, overfishing and the presence of Sea Lamprey, an invasive species, have contributed to a decline in the Lake Trout population.

[1] *Benthos* and *benthic community* refer to the invertebrate organisms, such as worms, nymphs and insect larvae that dwell for all or part of their lives in the bottom sediments of lakes and rivers. Scientists often use the health and abundance of these organisms as indicators of contaminant toxicity and ecosystem health.

Ontario

Canada

PARTNERSHIPS IN ENVIRONMENTAL PROTECTION

Jackfish Bay was designated an Area of Concern in 1987 under the Canada–United States Great Lakes Water Quality Agreement. Areas of Concern are sites on the Great Lakes system where environmental quality is significantly degraded and beneficial uses are impaired. Currently, there are 9 such designated areas on the Canadian side of the Great Lakes, 25 in the United States, and 5 that are shared by both countries. In each Area of Concern, government, community and industry partners are undertaking a coordinated effort to address the environmental challenges and beneficial uses through a remedial action plan.

Remedial Action Plan Partners

Environment Canada and the Ontario Ministry of the Environment coordinate the development and implementation of the remedial action plans to protect and restore these Areas of Concern in Canada. Other partners in the cooperative effort in the Jackfish Bay Area of Concern include (in alphabetical order) EcoSuperior Environmental Programs, Lakehead University, the (former) Public Advisory Committee, the Public Area in Recovery Review Committee (which includes residents of the communities of Jackfish, Rossport and Schreiber) and the Town of Terrace Bay.

Remedial Action Plan Process

The Great Lakes Water Quality Agreement requires that remedial action plans be developed and implemented in three stages:

Stage 1: Identifying the Environmental Challenges

In Stage 1, the governments of Canada and Ontario, working with community stakeholders, undertook an extensive program of research and monitoring to assess environmental quality and identify the causes of degradation in the Area of Concern. The ***Stage 1 Remedial Action Plan Report***, summarizing the outcome of these efforts, was completed in 1991. The report identified seven environmental challenges needing to be addressed and known as *beneficial use impairments* in the Remedial Action Plan process. Their current status is described below in **Progress on Environmental Challenges**.

Stage 2: Planning and Implementing Remedial Actions

In Stage 2, the governments of Canada and Ontario, working with community stakeholders, undertook a detailed review of potential remedial actions to restore, protect and monitor environmental quality in the Area of Concern. The ***Stage 2 Remedial Action Plan Report***, which identified recommended remedial actions, was completed in 1998. The report concluded that the Area of Concern should be monitored for incremental improvements but that no further intervention was appropriate at that time. The conclusion followed major improvements to the treatment of effluent undertaken at the pulp mill in the 1990s that led to reductions in contaminant levels in effluent and receiving waters. The improvements included the installation of secondary treatment of effluent, changes in mill processes (to chlorine dioxide bleaching) and the diversion of mill effluent flow away from one of the small lakes.

The *Stage 2 Remedial Action Plan Report* recommended that a natural recovery plan be adopted to address most of the beneficial use impairments in the Area of Concern. The plan does not require the removal of contaminated sediment from the environment. Rather, natural processes will be relied on to cover contaminants in the sediment, effectively isolating them from the water column and food web. A status report for this Area of Concern was completed by Lakehead University in 2010.

Stage 3: Monitoring Actions and Delisting of the Area of Concern

The natural recovery recommendation in the *Stage 2 Remedial Action Plan Report* recognized that complete recovery and delisting for the Area of Concern would not occur without further treatment of pulp mill effluent. The ***Stage 3 Remedial Action Plan Report*** and delisting of Jackfish Bay as an Area of Concern will take place when monitoring confirms the natural recovery of the ecosystem. As of September 2010, there is no estimate of when the delisting will occur; however, the status report confirms that all feasible remedial actions have been completed and that the ecosystem has shown signs of recovery. The report recommends that Jackfish Bay be recognized as an Area in Recovery.

PROGRESS ON ENVIRONMENTAL CHALLENGES

Contaminant levels in effluent and receiving waters have decreased since the installation of secondary treatment and changes in mill processes to chlorine dioxide bleaching; however, mill-related effects on water quality are continuing.

The natural recovery plan for the Jackfish Bay Area of Concern recognizes that complete recovery and delisting for the area cannot occur unless the pulp mill continues to meet federal and provincial standards for effluent discharges. The recovery of the Jackfish Bay ecosystem needs to be monitored and evaluated by the Remedial Action Plan partners on a regular basis. Delisting will be considered when monitoring information confirms the restoration of environmental quality.

Status of Beneficial Use Impairments

The tables below summarize, for each of the seven beneficial use impairments in the Jackfish Bay Area of Concern, their status as of September 2010; key actions taken by various partner agencies and organizations under the Remedial Action Plan; and future key actions planned by the partners as they work towards the full restoration of environmental quality and eventual delisting of the Area of Concern.

STATUS – IMPAIRED

Degradation of Benthos

Status: ***Impaired***

Monitoring has confirmed impairment of the benthic community structure at several sites within the Area of Concern including Moberly, Tunnel and Jackfish bays, several sites along Blackbird Creek and in Moberly Lake.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Implemented federal pulp and paper regulations and the provincial Municipal/ Industrial Strategy for Abatement (MISA) regulations in the mid-1990s, which led to process changes and upgrades to wastewater treatment at the area pulp and paper mill ▪ Applied the Canada Ontario Decision Making Framework for the management of contaminated sediment and determined that monitored natural recovery is the appropriate management approach for the Jackfish Bay Area of Concern ▪ Completed a survey of benthic invertebrates and sediment quality in Blackbird Creek and Moberly Lake to assess the health of the benthic community	▪ Develop and implement a long-term monitoring plan for benthic invertebrates and sediment quality

Degradation of Fish and Wildlife Populations

Status: ***Impaired, for fish populations***

Impairment of the overall fish community and Lake Trout populations in particular was identified as a result of the presence of invasive species such as Sea Lamprey, the effects of pulp mill effluent, and the overharvesting of fish. Impairment of Herring Gulls was identified as a result of repeated nesting failure, but not related to pollution from pulp mill effluent.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Conducted a Lake Trout index netting project that indicated that the relative abundance of Lake Trout in Jackfish Bay was similar to sites outside of the bay (2001)	▪ Continue to monitor fish community to assess the health of fish populations within and adjacent to the Area of Concern

Loss of Fish and Wildlife Habitat

Status: ***Impaired***

Degradation of spawning habitat in Moberly Bay has been identified as one of the causes resulting in the reduction and loss of local fish communities.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Identified Lake Whitefish and Lake Trout spawning and nursery habitat on the eastern shore of Jackfish Bay	▪ Develop and implement a monitoring plan to assess fish habitat in Jackfish Bay

Status – REQUIRES FURTHER ASSESSMENT

Degradation of Aesthetics

Status: ***Requires further assessment***

The aesthetics are degraded as a result of the presence of foam and odour.

KEY ACTIONS

COMPLETED	REMAINING
▪ The use of foam barriers and the entombment of part of the creek by the mill have improved aesthetics since the early 1970s; however, the presence of foam and dark-coloured water in Blackbird Creek and Moberly Bay is still a concern at times	▪ Determine, through public input, whether completed remedial actions have adequately addressed aesthetic concerns

Restrictions on Fish and Wildlife Consumption

Status: ***Requires further assessment***

Restricted consumption of Lake Trout and Lake Whitefish is advised due to elevated levels of: dioxins or furans, mercury, PCBs,[2] mirex and pesticides.

KEY ACTIONS

COMPLETED	REMAINING
▪ Implemented federal pulp and paper regulations and the provincial Municipal/Industrial Strategy for Abatement (MISA) regulations in the mid-1990s, which led to process changes and upgrades to wastewater treatment at the area pulp and paper mill ▪ Collected samples for the sport fish contaminant monitoring program (2002, 2007 and 2008)	▪ Continue monitoring Jackfish Bay and the Schreiber and Sewell Point reference area as part of the Ministry of the Environment's sport fish contaminant monitoring program

[2] *Polychlorinated biphenyls* (PCBs) are synthetic chemicals that have wide industrial applications. The manufacturing and importing of PCBs were banned in North America in 1977. PCBs are very persistent (long-lasting) in the environment and can be transported over long distances.

Status – NOT IMPAIRED

Bird (or Other Animal) Deformities or Reproduction Problems

Status: ***Not Impaired***

Although reproductive problems in Herring Gulls were initially a concern, the problems were attributed to natural causes (i.e. predation). There are no reported incidences of deformities or reproductive problems in birds or other animals in Jackfish Bay.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Conducted studies of nesting waterbirds in the Area of Concern ▪ Confirmed, through discussion with local wildlife biologists and the Public Area in Recovery Review Committee, that no animal deformities and reproductive problems have been observed	▪ No further action required

Fish Tumours or Other Deformities

Status: ***Not Impaired***

An analysis completed in 2010 confirmed that fish tumours and other deformities do not occur more often in Jackfish Bay than in a reference site on Lake Superior.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Implemented federal pulp and paper regulations and the provincial Municipal/ Industrial Strategy for Abatement (MISA) regulations in the mid-1990s, which led to process changes and upgrades to wastewater treatment at area pulp and paper mills ▪ Conducted analysis of liver tumours in fish in Jackfish Bay and Mountain Bay (reference site)	▪ No further action required

FOR MORE INFORMATION

Environment Canada:
www.ec.gc.ca/raps-pas

North Shore of Lake Superior Remedial Action Plans:
www.northshorerap.ca

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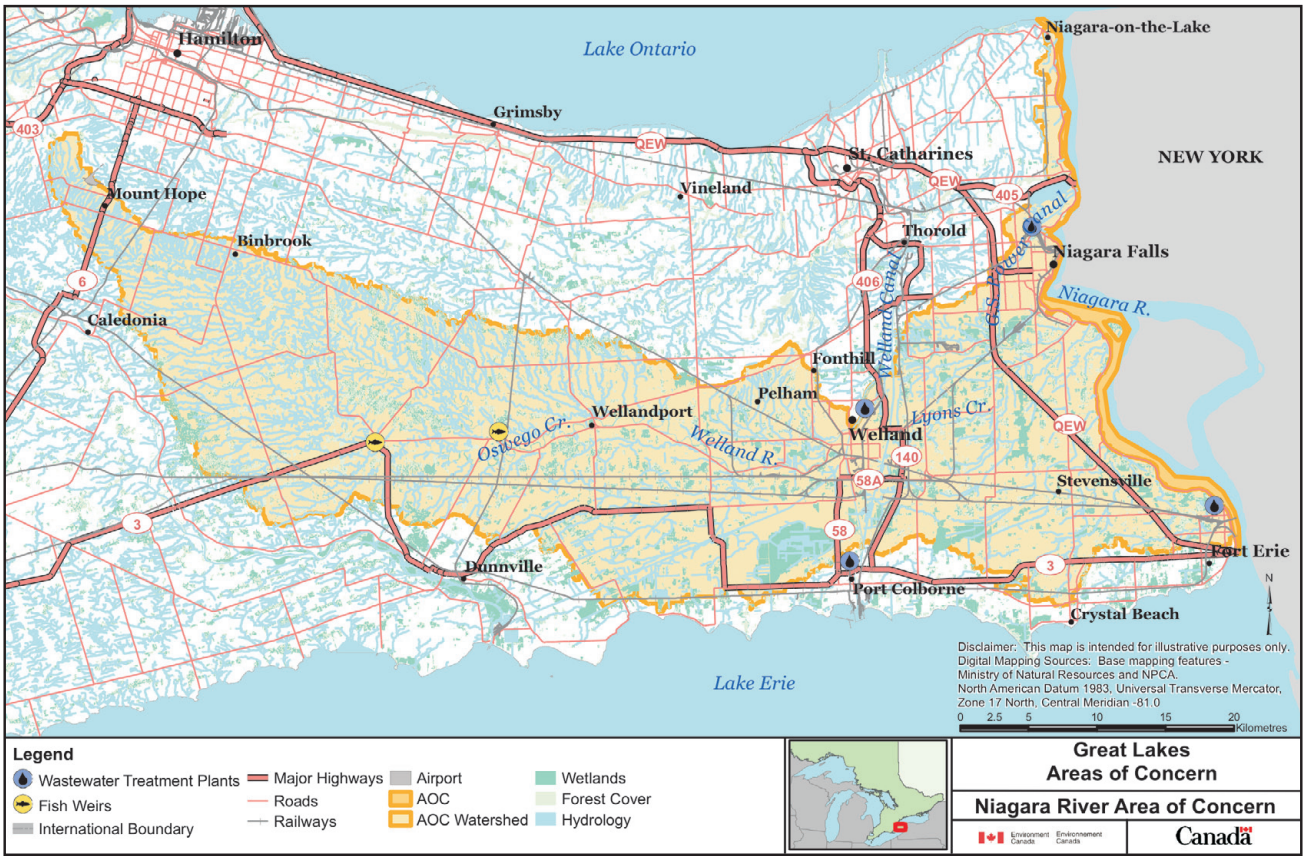
Niagara River
Area of Concern
Canadian Section
Status of Beneficial Use Impairments
September 2010

The Niagara River is a 58-km waterway connecting Lake Erie and Lake Ontario. The Canadian section of the Niagara River Area of Concern extends along the entire length of the Canadian side of the Niagara River, and includes the Canadian side of Niagara Falls and the Welland River watershed. The Niagara River drains extensive farmland on the Canadian side and passes through heavily industrialized, residential and parkland areas on the United States side. More than one half of the flow of the river is diverted for electrical power generation on both sides of the river. The river supports one of the largest and most diverse concentrations of gulls in the world, and its gorge and cliffs below the falls are habitat for some of the highest concentrations of rare plant species in Ontario.

Environmental concerns on the Canadian side of the Niagara River Area of Concern have focused on the loss and degradation of wetlands and fish habitat, and the resulting impacts on fish and wildlife populations that depend on this habitat. Most of these impacts are associated with non-point sources of pollution from rural areas of the Niagara–Welland River basin, particularly runoff of pesticides and nutrients. (By contrast, most of the environmental concerns in the United States section are associated with toxic contamination from past industrial management practices, particularly the seepage of toxic wastes from chemical dumps, and the discharge of municipal wastes.)



Ontario

Canada

PARTNERSHIPS IN ENVIRONMENTAL PROTECTION

The Niagara River was designated an Area of Concern in 1987 under the Canada–United States Great Lakes Water Quality Agreement. Areas of Concern are sites on the Great Lakes system where environmental quality is significantly degraded and beneficial uses are impaired. Currently, there are 9 such designated areas on the Canadian side of the Great Lakes, 25 in the United States, and 5 (including Niagara River) that are shared by both countries. In each Area of Concern, government, community and industry partners are undertaking a coordinated effort to restore environmental quality and beneficial uses through a remedial action plan.

Remedial Action Plan Partners

Responsibility for the Niagara River Area of Concern is shared jointly by both Canada and the United States. Remedial action plans have been developed and implemented independently in Ontario and New York State, in partnership with the respective local communities.

Environment Canada and the Ontario Ministry of the Environment coordinate the development and implementation of the remedial action plans for all Areas of Concern in Canada. Other partners in the cooperative effort in the Canadian section of the Niagara River Area of Concern include (in alphabetical order) Bird Studies Canada, the City of Niagara Falls, the City of Welland, the Niagara Parks Commission, the Niagara Peninsula Conservation Authority, the Niagara River Restoration Council, the Ontario Ministry of Natural Resources, the Region of Niagara, and the towns of Fort Erie and Niagara-on-the-Lake.

Remedial Action Plan Process

The Great Lakes Water Quality Agreement requires that remedial action plans be developed and implemented in three stages:

Stage 1: Identifying the Environmental Challenges

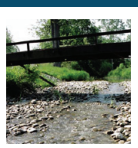
In Stage 1, the governments of Canada and Ontario, working with community stakeholders, undertook an extensive program of research and monitoring to assess environmental quality and identify the causes of degradation in the Area of Concern. The ***Stage 1 Remedial Action Plan Report***, summarizing the outcome of these efforts, was completed in 1993 and updated in 1995. The report identified 10 environmental challenges needing to be addressed and known as *beneficial use impairments* in the remedial action plan process. Their current status is described below in **Progress on Environmental Challenges**.

Stage 2: Planning and Implementing Remedial Actions

In Stage 2, the governments of Canada and Ontario, working with community stakeholders, undertook a detailed review of potential remedial actions to restore, protect and monitor environmental quality in the Area of Concern. The ***Stage 2 Remedial Action Plan Report***, which identified 37 recommended remedial actions, was completed in 1995. A work plan was developed to implement the recommendations. A Stage 2 update report on the implementation of the recommended actions and the development of delisting criteria and monitoring plans will be completed in 2010.

Stage 3: Monitoring Actions and Delisting of the Area of Concern

Completion of the ***Stage 3 Remedial Action Plan Report*** on the results of monitoring efforts to determine whether the environmental challenges have been addressed successfully through the remedial actions, is targeted for 2015. Delisting of the Niagara River (Canadian Section) as an Area of Concern can proceed following the report.



PROGRESS ON ENVIRONMENTAL CHALLENGES

The federal and provincial governments and partners have made considerable progress in addressing environmental challenges in the Niagara River Area of Concern. The Welland River watershed strategy has been developed and a rural watershed heritage strategy is being implemented. The latter has resulted so far in the planting of more than 96 000 trees, the installation of over 18 km of fencing to protect riparian habitat adjacent to watercourses, which reduces phosphorus entering local watercourses by more than 1500 kg per year. Contaminated sediments have been remediated in the Welland River. Also, through technology demonstrations, the City of Niagara Falls was able to identify a saving of $25 million for a low-cost, innovative and high-rate treatment of combined sewer overflows. The Region of Niagara also developed and is implementing the Niagara Water Quality Protection Strategy to protect sources of drinking water in the region.

Important work still remains to be completed before the Area of Concern can be delisted. Priority actions include addressing the sources of nutrients causing eutrophication of the Welland River and its tributaries; restoring and protecting fish and wildlife habitat, including unique habitats rarely found in other parts of the Great Lakes basin; implementing the monitored natural recovery strategy for PCB-contaminated sediment at Lyon's Creek East; and expanding efforts to promote landowner education and best management practices to reduce runoff pollution from non-point sources in rural areas. A further challenge will be for partners to secure the capital funding needed for major infrastructure upgrades to continue the efforts to reduce nutrients and other pollutants from combined sewer overflows.

Status of Beneficial Use Impairments

The tables below summarize, for each of the 10 beneficial use impairments in the Niagara River Area of Concern, their status as of September 2010; key actions taken by various partner agencies and organizations under the Remedial Action Plan; and future key actions planned by the partners as they work towards the full restoration of environmental quality and eventual delisting of the Area of Concern.

Status – IMPAIRED

Note that one of the challenges, *Restrictions on Fish and Wildlife Consumption*, appears under *impaired* (for fish) and *not impaired* (for wildlife), because the Remedial Action Plan partners agreed to consider the issues of fish consumption and wildlife consumption separately.

Beach Closings

Status: ***Impaired***

There are an excessive number of beach postings and an ongoing concern with *E. coli* at the Queens Royal Beach in Niagara-on-the-Lake.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Completed assessment of the status of four beaches in the Area of Concern (2007)	▪ Complete data analysis of updated beach data and compare against delisting criteria

Degradation of Benthos[1]

Status: ***Impaired***

Studies have confirmed that the benthic community structure has been damaged at 14 identified contaminated sites.

KEY ACTIONS

COMPLETED	REMAINING
▪ Remediated the Welland River Atlas Reef site (contaminated with PAHs[2] and metals) (1995) ▪ Completed detailed assessment of 14 potentially contaminated sites and identified 2 sites for further investigation—Lyon's Creek West and Lyon's Creek East ▪ Completed an ecological risk assessment posed by PCBs[3] in the sediment and bank soil at both Lyon's Creek sites (2005) ▪ Initiated a monitored natural recovery approach to managing contaminated sediments at the Lyon's Creek East site, following public consultation on management options ▪ Removed arsenic-contaminated sediments from the Lyon's Creek West site, following a human health risk assessment (2007)	▪ Continue to refine the Lyon's Creek East Sediment Management Strategy, given that monitored natural recovery is the selected management option; this work will include developing administrative controls to ensure that there is no disturbance of the sediments; modelling sediment and PCB fate and transport for Lyon's Creek East; and undertaking outreach and education ▪ Investigate sediment management options at Lyons Creek West

Degradation of Fish and Wildlife Populations

Status: ***Impaired***

Welland River flow reversals, body burden levels of contaminants[4] and habitat pressures have adversely affected colonial nesting birds, fish populations and wetland wildlife.

KEY ACTIONS

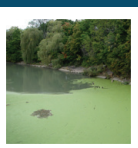
COMPLETED	REMAINING
▪ Completed the angler diary project that sought to involve local citizens in reporting on fish findings and observations ▪ Initiated assessments of colonial nesting bird and wetland wildlife populations	▪ Continue fish community monitoring and assessments of colonial bird and wetland wildlife populations ▪ Complete data analysis of updated wildlife population to determine whether this component should be listed as impaired

[1] *Benthos* and *benthic community* refer to the invertebrate organisms, such as worms, nymphs and insect larvae that dwell for all or part of their lives in the bottom sediments of lakes and rivers. Scientists often use the health and abundance of these organisms as indicators of contaminant toxicity and ecosystem health.

[2] *Polycyclic aromatic hydrocarbons* (PAHs) are chemical compounds found in oil, coal and tar deposits, and that also are produced as byproducts of fuel burning (whether fossil fuel or biomass). As pollutants, they are of concern because some compounds have been identified as carcinogenic.

[3] *Polychlorinated biphenyls* (PCBs) are synthetic chemicals that have wide industrial applications. The manufacturing and importing of PCBs were banned in North America in 1977. PCBs are very persistent (long-lasting) in the environment and can be transported over long distances.

[4] *Body burden levels of contaminants* refer to concentrations in edible tissues within wildlife in the Area of Concern relative to reference sites or guidelines.



Eutrophication[5] or Undesirable Algae

Status: ***Impaired***

No impairment in Niagara River, though total phosphorus levels in the Welland River consistently exceed provincial guidelines; there also is anecdotal evidence of periodic algal blooms in the Welland River, possibly linked to elevated levels of phosphorus.

KEY ACTIONS

COMPLETED	REMAINING
▪ Initiated a detailed assessment of this environmental challenge under the Welland River Eutrophication Study ▪ Undertook 23 projects to remediate non-point pollution sources in the Welland River watershed since 1994, resulting in preventing nearly 82 000 m^3 of manure a year from entering area waters ▪ Completed comprehensive review of the City of Welland Official Plan and recommended incorporation of policies on the Remedial Action Plan's priority issues (combined sewer overflows, Lyon's Creek contaminated sediments, urban stormwater management) ▪ Commissioned a new wastewater treatment facility in Niagara Falls to capture and treat a major portion of the city's combined sewer overflows (2007—currently under operations evaluation)	▪ Complete assessment of this environmental challenge through the Welland River Eutrophication Study and develop delisting criteria in 2010 ▪ Monitor the combined sewer overflow high-rate treatment facility at Niagara Falls ▪ Monitor combined sewer overflows and investigate infrastructure needs in the City of Welland relating to wet weather issues to determine effective options to address priority overflows ▪ Complete environmental assessment for wet weather treatment in Welland

Loss of Fish and Wildlife Habitat

Status: ***Impaired***

Degradation of wetland, in-stream, shoreline and woodland habitats (in terms of size, quantity and composition) has been identified as one of the factors resulting in the reduction and loss of indicator fish and wildlife species.[6]

KEY ACTIONS

COMPLETED	REMAINING
▪ Completed the Welland River fish barrier program, which resulted in the mitigation or removal of 165 fish barriers, freeing up more than 800 km of potential fish habitat ▪ Created 147 ha of wetland; planted 54 km of shoreline vegetation and 338 ha of forest ▪ Implemented several Walleye restoration projects ▪ Completed the Natural Heritage Inventory for the Niagara River Area of Concern	▪ Develop specific habitat targets relative to reference sites outside the Area of Concern ▪ Continue to implement fish and habitat program with priorities as determined by the updated Stage 2 work plan

[5] *Eutrophication* (or *eutrophic conditions*) is the process by which lakes and other water bodies are enriched by nutrients (usually phosphorus and nitrogen), which leads to excessive plant growth and oxygen depletion.

[6] *Indicator species* are species whose presence, absence, or relative well-being in a given environment is a sign of the overall health of its ecosystem.

Restrictions on Fish and Wildlife Consumption

Status: ***Impaired, for fish consumption***

Restricted consumption of sport fish is advised due to elevated levels of PCBs, dioxins, furans, dioxin-like PCBs and mercury.

KEY ACTIONS

COMPLETED	REMAINING
▪ Implemented the provincial Municipal/Industrial Strategy for Abatement (MISA) regulations in the mid-1990s, which eliminated persistent toxic substances and addressed other problems associated with industrial point source discharges entering the Niagara River ▪ Confirmed that there are no known Canadian point-sources for mercury or dioxins or furans to the Niagara River, and identified, through the binational Niagara River Toxics Management Plan, that there has been an overall decrease of toxic chemicals discharged into the Niagara River ▪ Completed an assessment of the sport fish contaminant data ▪ Completed environmental and human health risk assessments for the Lyon's Creek East PCB-contaminated sediment site, which found no risk to human health	▪ Continue monitoring of contaminants in the Niagara River through the Niagara River Toxics Management Plan ▪ Continue to monitor sport fish ▪ Continue to monitor the status of sediment quality in Lyon's Creek East ▪ Continue to refine the Lyon's Creek East Sediment Management Strategy, including developing administrative controls to ensure that there is no disturbance of the sediments; conducting modelling of the sediment and PCB fate and transport for Lyon's Creek East; and undertaking public outreach and education

Status – REQUIRES FURTHER ASSESSMENT

Degradation of Phytoplankton and Zooplankton[7] Populations

Status: ***Requires further assessment***

There is a need for further assessment to determine the status of this environmental challenge.

KEY ACTIONS

COMPLETED	REMAINING
▪ Initiated a monitoring study of *Chlorophyll a* under the Welland River Eutrophication Study	▪ Complete assessment for this environmental challenge

[7] *Phytoplankton* and *zooplankton* are the collection of small or microscopic water-borne plant and animal organisms (respectively) that float or drift in great numbers, especially at or near the water's surface, and that serve as food for fish and other larger organisms.

Status – NOT IMPAIRED

Bird (or Other Animal) Deformities or Reproduction Problems

Status: *Not Impaired*

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Completed assessment of Snapping Turtles and Mink at the Lyon's Creek East contaminated sediment site; found no concerns with deformities/reproduction associated with contaminant exposure compared to reference sites (2007)	▪ No further action required

Fish Tumours or Other Deformities

Status: *Not Impaired*

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Collected data to update the status of this environmental challenge (2008 and 2009) ▪ Completed data analysis of updated fish tumour rates and compared against delisting criteria	▪ No further action required

Restrictions on Fish and Wildlife Consumption

Status: *Not Impaired, for wildlife consumption*

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Identified Snapping Turtles and migratory and resident waterfowl as target species requiring further investigation (see also *Degradation of Fish and Wildlife Populations* above) ▪ Found no evidence of human consumption of eggs of turtles or waterfowl; however, in response to anecdotal information regarding Snapping Turtle consumption, the provincial sport fish consumption guidebook now includes guidance on Snapping Turtle consumption	▪ No further action required

FOR MORE INFORMATION

Environment Canada:
www.ec.gc.ca/raps-pas

Niagara Peninsula Conservation Authority:
www.npca.ca/water-management/nrap/default.htm

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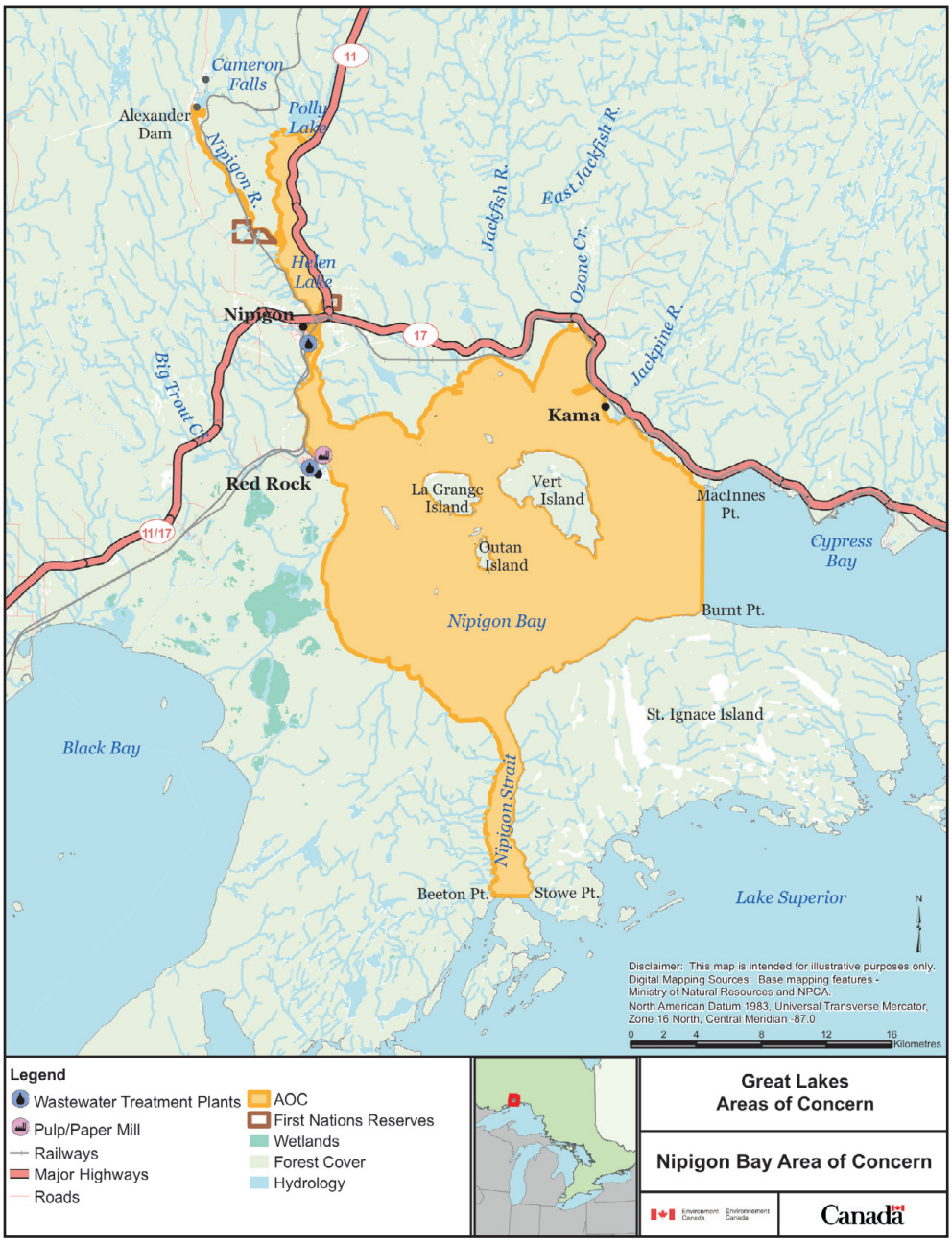
Nipigon Bay
Area of Concern
Status of Beneficial Use Impairments
September 2010

Nipigon Bay is in the most northerly area of Lake Superior. The Area of Concern takes in a large portion of Nipigon Bay and the Nipigon River, the largest tributary to Lake Superior, and the communities of Red Rock and Nipigon. There are Ontario Power Generation dams on the Nipigon River for the generation of hydroelectricity. The area supports a variety of wetlands and bird populations, including one of four known pelican colonies in Ontario. The watershed forests on both sides of the Nipigon River have been allocated for forest harvesting.

Environmental concerns in the Nipigon Bay Area of Concern are related to water level and flow fluctuations in Lake Nipigon and the Nipigon River from the generation of hydroelectricity. These fluctuations affect stream bank stability, sediment load and fish and wildlife habitat. Other concerns include the accumulation of wood fibre, bark and other organic material from past log drives, and effluent discharges from a linerboard mill (which closed in 2006) and the municipal sewage treatment plants in Nipigon and Red Rock.



Ontario

Canada

PARTNERSHIPS IN ENVIRONMENTAL PROTECTION

Nipigon Bay was designated an Area of Concern in 1987 under the Canada–United States Great Lakes Water Quality Agreement. Areas of Concern are sites on the Great Lakes system where environmental quality is significantly degraded and beneficial uses are impaired. Currently, there are 9 such designated areas on the Canadian side of the Great Lakes, 25 in the United States, and 5 that are shared by both countries. In each Area of Concern, government, community and industry partners are undertaking a coordinated effort to restore environmental quality and beneficial uses through a remedial action plan.

Remedial Action Plan Partners

Environment Canada and the Ontario Ministry of the Environment coordinate the development and implementation of the remedial action plans to protect and restore these Areas of Concern in Canada. Other partners in the cooperative effort in the Nipigon Bay Area of Concern include (in alphabetical order) EcoSuperior Environmental Programs, Fisheries and Oceans Canada, Lakehead University, the Ontario Ministry of Natural Resources, Parks Canada, the Public Advisory Committee and the towns of Nipigon and Red Rock.

Remedial Action Plan Process

The Great Lakes Water Quality Agreement requires that remedial action plans be developed and implemented in three stages:

Stage 1: Identifying the Environmental Challenges

In Stage, 1 the governments of Canada and Ontario, working with community stakeholders, undertook an extensive program of research and monitoring to assess environmental quality and identify the causes of degradation in the Area of Concern. The ***Stage 1 Remedial Action Plan Report***, summarizing the outcome of these efforts, was completed in 1991. The report identified eight environmental challenges needing to be addressed and known as *beneficial use impairments* in the Remedial Action Plan process.

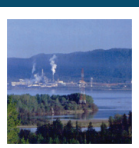
Stage 2: Planning and Implementing Remedial Actions

In Stage 2, the governments of Canada and Ontario, working with community stakeholders, undertook a detailed review of potential remedial actions to restore, protect and monitor environmental quality in the Area of Concern. The ***Stage 2 Remedial Action Plan Report***, which identified 34 recommended remedial actions, was completed in 1995. Most of these actions have been implemented. Of the original eight beneficial use impairments, three were addressed by the time Stage 2 was completed (*tainting of fish and wildlife flavour, fish tumours and other deformities, and restrictions on dredging activities*). Recent monitoring and assessment has also shown that a fourth beneficial use impairment is no longer impaired (*eutrophication*[1] *or undesirable algae*). The designation of this beneficial use impairment to *not impaired* status is pending. The current status of the remaining five beneficial use impairments is described below in **Progress on Environmental Challenges**.

Stage 3: Monitoring Actions and Delisting of the Area of Concern

The ***Stage 3 Remedial Action Plan Report*** on the results of monitoring efforts to confirm that the environmental challenges have been addressed successfully through the remedial actions, is targeted for completion in 2011. Delisting Nipigon Bay as an Area of Concern can be initiated following review and approval of the *Stage 3 Remedial Action Plan Report* by the Remedial Action Plan partners.

[1] *Eutrophication* (or *eutrophic conditions*) is the process by which lakes and other water bodies are enriched by nutrients (usually phosphorus and nitrogen), which leads to excessive plant growth and oxygen depletion.



PROGRESS ON ENVIRONMENTAL CHALLENGES

The federal and provincial governments and partners have made considerable progress in addressing environmental challenges in the Nipigon Bay Area of Concern. Notable successes have included the development of a bioengineered marina at Red Rock, which features armour stone breakwalls that provide public access and fish and wildlife habitat; the development and implementation of the Nipigon River Water Management Plan, which has provided a workable solution to water use conflicts arising from regulated flows; and the realignment of Clearwater Creek, which restored valuable Brook Trout habitat in the Area of Concern.

Delisting of the Area of Concern is conditional on the completion of the remaining remedial actions, including upgrades to the Red Rock and Nipigon sewage treatment plants to provide full secondary treatment and restoration of former Brook Trout habitat in Kama Creek. A review of restoration targets and detailed assessment of the current status of all environmental challenges against these restoration targets will be the focus of the *Stage 3 Remedial Action Plan Report*, expected in 2011.

Status of Beneficial Use Impairments

The tables below summarize, for each of the five beneficial use impairments in the Nipigon Bay Area of Concern, their status as of September 2010; key actions taken by various partner agencies and organizations under the Remedial Action Plan; and future key actions planned by the partners as they work towards the full restoration of environmental quality and eventual delisting of the Area of Concern.

Status – IMPAIRED

Degradation of Aesthetics

Status: ***Impaired***

Aesthetics are degraded as a result of industrial development along the waterfront and the presence of foam in effluent from the Domtar Mill.

KEY ACTIONS

COMPLETED	REMAINING
▪ Installed secondary treatment and a foam barrier at the Domtar wastewater treatment plant ▪ Completed improvements to the Red Rock Marina and Nipigon waterfront ▪ Completed restoration of Clearwater Creek	▪ Upgrade primary sewage treatment plants in Nipigon and Red Rock ▪ Confirm status with the Public Advisory Committee

Degradation of Benthos[2]

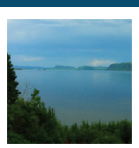
Status: ***Impaired***

Monitoring has confirmed impairment of the benthic community structure in the vicinity of the outfalls of the Nipigon and Red Rock sewage treatment plants and the Domtar Mill.

KEY ACTIONS

COMPLETED	REMAINING
▪ Completed a study of the Nipigon wastewater treatment plant that concluded water quality impacts are localized and rapidly dilute with the flow of the Nipigon River; the study also showed some impact on the benthic community (2004) ▪ Undertook benthic assessments of sediment toxicity to identify causes of sediment toxicity (2003 and 2009) ▪ Implemented federal pulp and paper regulations and the provincial Municipal/Industrial Strategy for Abatement (MISA) regulations in the mid-1990s, which led to process changes and upgrades to wastewater treatment at area pulp and paper mills	▪ Complete benthos assessment and status report from 2009 sampling ▪ Upgrade primary sewage treatment plants in Nipigon and Red Rock

[2] *Benthos* and *benthic community* refer to the invertebrate organisms, such as worms, nymphs and insect larvae that dwell for all or part of their lives in the bottom sediments of lakes and rivers. Scientists often use the health and abundance of these organisms as indicators of contaminant toxicity and ecosystem health.



Loss of Fish and Wildlife Habitat

Status: ***Impaired***

Degradation of spawning and nursery habitat has been identified as one of the causes of the reduction of Walleye and Brook Trout populations.

KEY ACTIONS

COMPLETED	REMAINING
▪ Restored degraded habitat and provided a stormwater management plan for local Brook Trout stream; the restoration work included culvert replacement and the realignment of the stream to increase the amount of spawning and nursery habitat ▪ Ensured that Walleye stock recovery was not hampered by degraded spawning habitat	▪ Continue to monitor fish populations in rehabilitated and historic habitat areas to determine the success of rehabilitation efforts ▪ Rehabilitate historic Brook Trout spawning and nursery habitat in Kama Creek and remove the barrier to fish migration

Status – REQUIRES FURTHER ASSESSMENT

Degradation of Fish and Wildlife Populations

Status: ***Requires further assessment***

Impairment of Walleye, Perch, Brook Trout and Lake Trout populations as a result of fluctuating water levels, degraded water quality and habitat, over-exploitation, Sea Lamprey predation, and lampricide treatments may have largely been addressed through the Nipigon River Water Management Plan, habitat improvement projects, fisheries management and the lamprey control program. While fish populations may not be restored to historic levels, this may not be due to causes within the AOC.

KEY ACTIONS

COMPLETED	REMAINING
▪ Developed binational rehabilitation plans for four native fish species—Brook Trout, Walleye, Lake Sturgeon and Lake Trout—with the overall goal of maintaining, enhancing and rehabilitating self-sustaining populations in areas where the species were originally found ▪ Completed study to map critical habitat for Brook Trout in the Area of Concern ▪ Carried out rehabilitation work for Brook Trout in the binational waters of Lake Superior and its tributary streams, including conducting creel surveys, monitoring movement, and completing habitat rehabilitation projects ▪ Monitored Walleye population recovery at specific sites over several years ▪ Monitored relative abundances of fish populations and angling pressure through creel surveys ▪ Reinstated stock of Lake Trout in response to impact of Sea Lamprey (2003)	▪ Continue to monitor the fish community to assess the health of fish populations within and adjacent to the Area of Concern

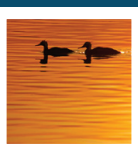
Status – NOT IMPAIRED (pending re-designation)

Eutrophication or Undesirable Algae

Status: ***Not Impaired (pending)***

Historical information suggested that nuisance algal blooms in the lower Nipigon River may affect Walleye spawning, related to elevated levels of phosphorus downstream of the Nipigon sewage treatment plant.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Carried out an assessment of the lower Nipigon River that determined much of the rock, boulder and rubble in the area remains suitable for Walleye spawning and egg incubation ▪ Sampled and analyzed algae in the upper river to assess potential impact	▪ Compile water quality data to determine phosphorous levels in the lower Nipigon River



FOR MORE INFORMATION

Environment Canada:
www.ec.gc.ca/raps-pas

North Shore of Lake Superior Remedial Action Plans:
www.northshorerap.ca

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Peninsula Harbour

Area of Concern

Status of Beneficial Use Impairments

September 2010

Peninsula Harbour is located on the northeastern shore of Lake Superior, at the town of Marathon, midway between Sault Ste. Marie and Thunder Bay. The Area of Concern includes the harbour, from the peninsula to Ypres Point, and extends about 4 km offshore into Lake Superior past Pebble Beach, southeast of the peninsula.

Environmental concerns have focused on the impacts of the effluent discharges from the municipal sewage treatment plant, a pulp mill and a chlor-alkali plant that operated adjacent to the pulp mill from 1952 to 1977. These concerns included problems with bacterial contamination, aesthetic impairments, loss of fish habitat, and high levels of toxic contaminants in lake bottom sediments and fish.

Ontario

Canada

PARTNERSHIPS IN ENVIRONMENTAL PROTECTION

Peninsula Harbour was designated an Area of Concern in 1987 under the Canada–United States Great Lakes Water Quality Agreement. Areas of Concern are sites on the Great Lakes system where environmental quality is significantly degraded and beneficial uses are impaired. Currently, there are 9 such designated areas on the Canadian side of the Great Lakes, 25 in the United States, and 5 that are shared by both countries. In each Area of Concern, government, community and industry partners are undertaking a coordinated effort to restore environmental quality and beneficial uses through a remedial action plan.

Remedial Action Plan Partners

Environment Canada and the Ontario Ministry of the Environment coordinate the development and implementation of the remedial action plans to protect and restore these Areas of Concern in Canada. Other partners in the cooperative effort in the Peninsula Harbour Area of Concern have included (in alphabetical order) the Community Liaison Committee, EcoSuperior Environmental Programs, Marathon Pulp Inc., the Ojibways of the Pic River First Nation, the Ontario Ministry of Natural Resources, the (former) Public Advisory Committee, and the Town of Marathon.

Remedial Action Plan Process

The Great Lakes Water Quality Agreement requires that remedial action plans be developed and implemented in three stages:

Stage 1: Identifying the Environmental Challenges

In Stage 1, the governments of Canada and Ontario, working with community stakeholders, undertook an extensive program of research and monitoring to assess environmental quality and identify the causes of degradation in the Area of Concern. The ***Stage 1 Remedial Action Plan Report***, summarizing the outcome of these efforts, was completed in 1991. By that time, the problems of bacterial contamination and aesthetic impairments in the harbour had been addressed to a large extent by upgrades to the pulp mill and the municipal wastewater treatment plant.

The report identified five environmental challenges needing to be addressed and known as *beneficial use impairments* in the Remedial Action Plan process. Their current status is described below in ***Progress on Environmental Challenges***.

Stage 2: Planning and Implementing Remedial Actions

In Stage 2, the governments of Canada and Ontario, working with community stakeholders, undertook a detailed review of potential remedial actions to restore, protect and monitor environmental quality in the Area of Concern. The draft ***Stage 2 Remedial Action Plan Report***, which identified recommended remedial actions, was completed in 2000. The report examined options for remediating contaminated sediments, which led to further study and scientific work to characterize the environmental risks and benefits, technical feasibility and the costs of managing the contaminated sediment.

Stage 3: Monitoring Actions and Delisting of the Area of Concern

The ***Stage 3 Remedial Action Plan Report***, confirming that the environmental challenges have been addressed successfully, will be completed once the sediment management strategy has been implemented and the partner agencies and organizations confirm the results through monitoring. Implementation of the sediment management strategy is scheduled for 2011, with a follow-up monitoring plan providing assessment in three to five years. As of September 2010, there is no estimate of when Peninsula Harbour will be delisted as an Area of Concern.

PROGRESS ON ENVIRONMENTAL CHALLENGES

The federal and provincial governments and partners have made considerable progress in addressing the environmental challenges, particularly with regards to problems of bacterial contamination and aesthetic impairments in the harbour. The remaining environmental challenges in Peninsula Harbour are linked to the presence of sediments contaminated with mercury, PCBs[1] and organic debris (wood wastes). The wood wastes represent the accumulation of wood fibre and bark from log booming activities, which ended in 1983.

Remedial actions are focusing on the accessible water areas of the harbour, where sediments have high concentrations of mercury and PCBs. Remediation of the deeper areas will be achieved through natural sedimentation processes. In 2008, Environment Canada and the Ontario Ministry of the Environment, with input from Pic River First Nation, the Town of Marathon and the community, selected a strategy for managing contaminated sediment in the Area of Concern. The selected strategy involves placing a thin 15-cm layer cap of clean sand over the area in Jellicoe Cove with the highest levels of contamination. The cap will reduce the risk of the contaminants spreading from the cove into the rest of Peninsula Harbour, and will reduce fish and wildlife exposure to contaminants. Implementation of this approach is expected to start in 2011.

Status of Beneficial Use Impairments

The tables below summarize, for each of the five beneficial use impairments in the Peninsula Harbour Area of Concern, their status as of September 2010; key actions taken by various partner agencies and organizations under the Remedial Action Plan; and future key actions planned by the partners as they work towards the full restoration of environmental quality and eventual delisting of the Area of Concern.

[1] *Polychlorinated biphenyls* (PCBs) are synthetic chemicals that have wide industrial applications. The manufacturing and importing of PCBs were banned in North America in 1977. PCBs are very persistent (long-lasting) in the environment and can be transported over long distances.

Status – IMPAIRED

Degradation of Benthos[2]

Status: ***Impaired***

Monitoring has confirmed impairment of the benthic community structure within Jellicoe Cove.

KEY ACTIONS

COMPLETED	REMAINING
▪ Implemented federal pulp and paper regulations and the provincial Municipal/ Industrial Strategy for Abatement (MISA) regulations in the mid-1990s, which led to process changes and upgrades to wastewater treatment at area pulp and paper mills ▪ Conducted an environmental risk assessment of the Area of Concern, which, following public review and comment, led to the development of options for managing contaminated sediment ▪ Developed a plan to reduce the risk of contamination spreading from Jellicoe Cove into the rest of Peninsula Harbour by placing a cap over the area with the highest level of contamination; this approach will reduce exposure of benthos to contaminants within Jellicoe Cove	▪ Monitor the establishment of a new benthic community within Jellicoe Cove after placement of the thin-layer cap and compare this new community to those in surrounding areas

Degradation of Fish and Wildlife Populations

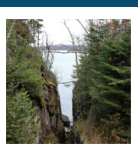
Status: ***Impaired, for fish populations***

Impairment of Lake Trout populations has been identified as a result of over-exploitation, the introduction of Sea Lamprey and the destruction of spawning habitat.

KEY ACTIONS

COMPLETED	REMAINING
▪ Assessed Lake Trout stocks in western Lake Superior, including sites located within the Area of Concern (2002) ▪ Undertook stocking of Lake Trout both within and adjacent to the Area of Concern (1981 to 2006)	▪ Continue to monitor the fish community to assess the health of fish populations within and adjacent to the Area of Concern

[2] *Benthos* and *benthic community* refer to the invertebrate organisms, such as worms, nymphs and insect larvae that dwell for all or part of their lives in the bottom sediments of lakes and rivers. Scientists often use the health and abundance of these organisms as indicators of contaminant toxicity and ecosystem health.



Loss of Fish and Wildlife Habitat

Status: ***Impaired***

Degradation of spawning habitat from the accumulation of wood fibre and bark in Jellicoe and Beatty Coves has been identified as one of the causes resulting in the reduction and loss of Lake Trout populations.

KEY ACTIONS

COMPLETED	REMAINING
▪ Greatly reduced the levels of organic matter entering the harbour through past upgrades at the mill and wastewater treatment plant	▪ Assess the extent of quality fish habitat throughout the Area of Concern

Restrictions on Dredging Activities

Status: ***Impaired***

Navigational dredging of sediment from within the Area of Concern may be restricted due to elevated levels of mercury and PCBs or due to restrictions imposed by the contaminated sediment management plan.

KEY ACTIONS

COMPLETED	REMAINING
▪ Implemented federal pulp and paper regulations and the provincial Municipal/ Industrial Strategy for Abatement (MISA) regulations in the mid-1990s, which led to process changes and upgrades to wastewater treatment at area pulp and paper mills ▪ Considered needs for operational/navigational dredging in sediment management plan (2009)	▪ Determine localized restrictions on dredging as a result of the placement of the thin-layer cap

Restrictions on Fish and Wildlife Consumption

Status: ***Impaired***

Restricted consumption of Longnose Sucker, White Sucker, Walleye, Round Whitefish, Lake Whitefish and Lake Trout is advised due to elevated levels of mercury, PCBs or toxaphene.

KEY ACTIONS

COMPLETED	REMAINING
▪ Implemented federal pulp and paper regulations and the provincial Municipal/ Industrial Strategy for Abatement (MISA) regulations in the mid-1990s, which led to process changes and upgrades to wastewater treatment at area pulp and paper mills ▪ Conducted an environmental risk assessment of the Area of Concern, which, following public review and comment, led to the development of options for managing contaminated sediment ▪ Developed a plan to reduce the risk of contamination spreading from Jellicoe Cove into the rest of Peninsula Harbour by placing a cap over the area with the highest level of contamination ▪ Collected fish samples for the Ontario sport fish contaminant monitoring program (2002, 2007 and 2008)	▪ Develop and implement a long-term monitoring plan to guide the assessment of mercury and PCB levels in sport fish ▪ Determine whether contaminant levels in fish are significantly higher in Peninsula Harbour compared to other Lake Superior sites following implementation of the contaminated sediment management plan

FOR MORE INFORMATION

Environment Canada:
www.ec.gc.ca/raps-pas

Lake Superior Binational Forum:
www.superiorforum.org

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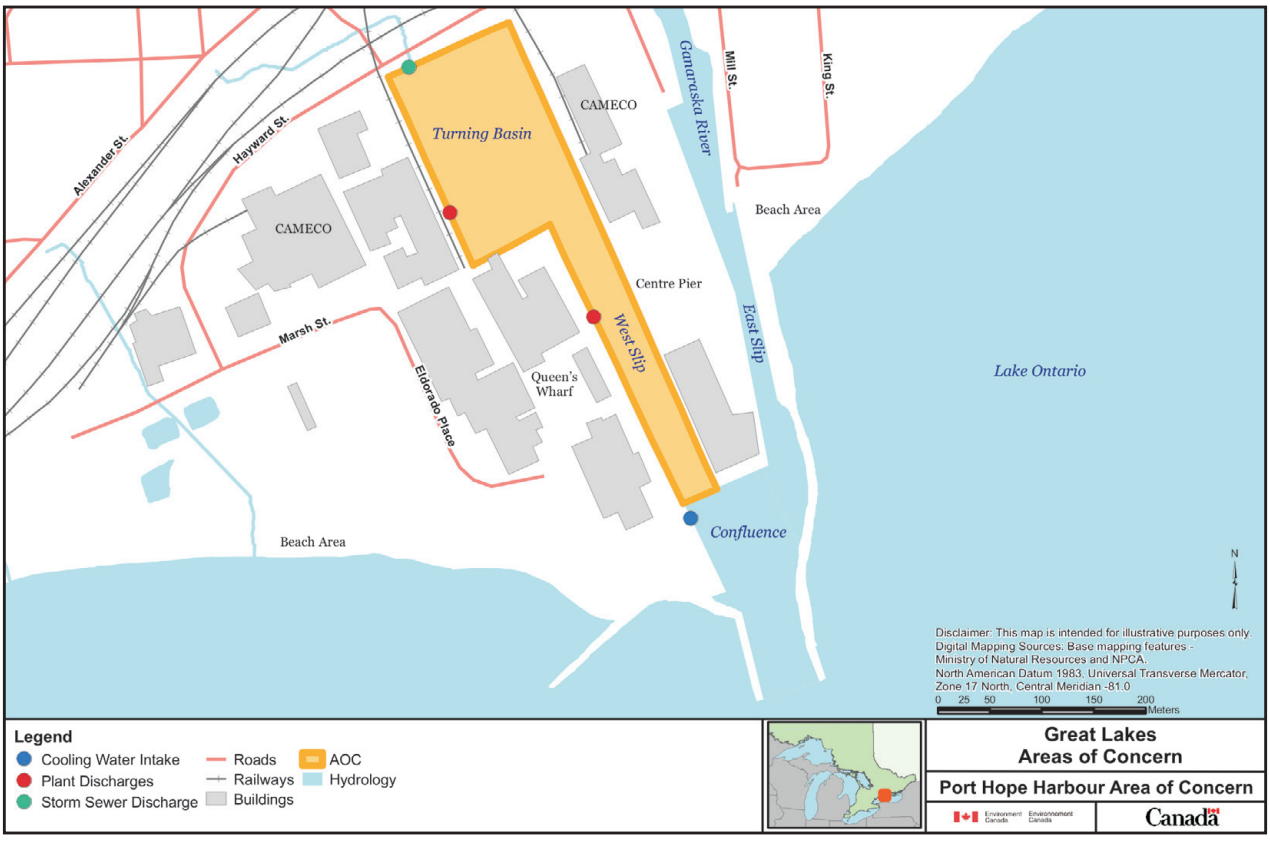
Port Hope Harbour
Area of Concern
Status of Beneficial Use Impairments
September 2010

The Port Hope Harbour Area of Concern is located in the Municipality of Port Hope at the mouth of the Ganaraska River on the north shore of Lake Ontario, 100 km east of Toronto. The Area of Concern includes the harbour basin and extends 300 m from the lower Ganaraska River to the confluence area bounded by breakwalls. The harbour is used as a receiving water body for cooling waters from a uranium conversion facility. In the past, Port Hope Harbour was a major Great Lakes port. It now serves as a recreational boat mooring area.

Environmental concerns in the Port Hope Harbour Area of Concern focus on the contamination of the harbour sediments as a result of past waste management practices in the refining and processing of uranium and radium at a facility located beside the harbour. From the 1940s until the late 1980s, the facility was owned and operated by Eldorado Nuclear Limited, a federal Crown corporation. An estimated 110 000 m^3 of sediments in the turning basin and west slip areas of Port Hope Harbour are contaminated with uranium- and thorium-series radionuclides, heavy metals, and PCBs.[1] Most of the contamination occurred between 1933 and 1953, when low-level radioactive waste was stockpiled on the plant site or disposed of in ravines and vacant lots throughout Port Hope. It is likely that surface runoff led to the contamination of the harbour.



[1] *Polychlorinated biphenyls* (PCBs) are synthetic chemicals that have wide industrial applications. The manufacturing and importing of PCBs were banned in North America in 1977. PCBs are very persistent (long-lasting) in the environment and can be transported over long distances.

Ontario

Canada

PARTNERSHIPS IN ENVIRONMENTAL PROTECTION

Port Hope Harbour was designated an Area of Concern in 1987 under the Canada–United States Great Lakes Water Quality Agreement. Areas of Concern are sites on the Great Lakes system where environmental quality is significantly degraded and beneficial uses are impaired. Currently, there are 9 such designated areas on the Canadian side of the Great Lakes, 25 in the United States, and 5 that are shared by both countries. In each Area of Concern, government, community and industry partners are undertaking a coordinated effort to restore environmental quality and beneficial uses through a remedial action plan.

Remedial Action Plan Partners

The development and implementation of the remedial action plan for the Port Hope Harbour Area of Concern is a cooperative effort involving the federal, provincial and municipal governments and industry. Cameco Corporation, the current owner of the uranium conversion facility, has developed additional plans to clean up low-level radioactive waste from the Cameco facility site over the coming years.

Remedial Action Plan Process

The Great Lakes Water Quality Agreement requires that remedial action plans be developed and implemented in three stages:

Stage 1: Identifying the Environmental Challenges

In Stage 1, the governments of Canada and Ontario, working with community stakeholders, undertook an extensive program of research and monitoring to assess environmental quality and identify the causes of degradation in the Area of Concern. The ***Stage 1 Remedial Action Plan Report***, summarizing the outcome of these efforts, was completed in 1990. The report concluded that the only environmental challenge, known as *beneficial use impairment* in the remedial action plan process, is the restriction of dredging activities. Maintenance dredging in the harbour cannot be undertaken until the contaminated sediments are removed. The current status of the beneficial use impairment is described below in **Progress on Environmental Challenges**.

Stage 2: Planning and Implementing Remedial Actions

In Stage 2, the governments of Canada and Ontario, working with community stakeholders, undertake a review of potential remedial actions to restore the beneficial use impairments identified in Stage 1. The ***Stage 2 Remedial Action Plan Report*** for the Port Hope Harbour Area of Concern has not yet been prepared as this is a unique situation as described below.

Stage 3: Monitoring Actions and Delisting of the Area of Concern

The ***Stage 3 Remedial Action Plan Report*** will be completed when monitoring confirms that the environmental challenge has been addressed successfully through the remedial actions. As of September 2010, there is no estimate of when Port Hope Harbour will be delisted as an Area of Concern.

PROGRESS ON ENVIRONMENTAL CHALLENGES

The Port Hope Harbour Remedial Action Plan is following a unique process, as long-term progress towards delisting of the Area of Concern is contingent upon the establishment of a facility for managing low-level radioactive waste. A priority for the immediate future is completion of construction of the new facility in the Municipality of Port Hope. That step will allow the remediation of contaminated sites to begin as early as 2012 in different locations within the municipality, including the Port Hope Harbour.

More specifically, this unique process includes the implementation of two concurrent initiatives to address the radioactive waste in the Port Hope area:

1. The first initiative is a federal government undertaking, the *Port Hope Area Initiative*, launched in 2001, which is focusing on cleaning up and managing the low-level radioactive waste from a number of sites, including the Port Hope Harbour. Natural Resources Canada is leading the initiative, which is being carried out in four phases:

- The first two phases required site characterization and environmental assessment of the project and subsequent regulatory review. The environmental assessment was completed in 2007. It concluded that the project is not likely to cause significant adverse environmental effects. In 2009, Atomic Energy Canada Limited was granted a five-year license by the Canadian Nuclear Safety Commission to commence the design and construction phase of the project. Sediment studies have been conducted in the harbour to characterize the contaminated sediments and develop clean-up criteria. Studies also have been completed to assess the physical condition of the harbour perimeter and determine potential impacts to crib and wall support structures resulting from the presence of the historic contaminated sediment.

- The third phase involves constructing one new long-term waste management facility and then cleaning up the waste. Once the facility is ready, it is expected that cleaning up the harbour will take about 18 months. Hydraulic suction dredging has been identified as the most appropriate means of remediating the contaminated sediments in the harbour. The harbour basin will be isolated during remediation by wave reduction and silt curtain systems.

- The final phase provides for maintenance and long-term monitoring to ensure that the facility operates safely and effectively into the future.

2. The second initiative, called *Vision 2010*, has been proposed by Cameco Corporation, which now owns the former Eldorado property. Cameco is proposing the removal and long-term storage of 150 000 m^3 of contaminated soil and waste material from its property adjacent to the harbour at the new long-term waste management facility. In addition, Cameco plans to remove two thirds of the site's 30 buildings. Cameco Corporation expects to be able to select its preferred option and submit its environmental assessment to the Minister of the Environment by the end of 2010.

Status of Beneficial Use Impairments

The table below summarizes, for the one beneficial use impairment in the Port Hope Harbour Area of Concern, its status as of September 2010; key actions taken by various partner agencies and organizations under the remedial action plan; and future key actions planned by the partners as they work towards the full restoration of environmental quality and eventual delisting of the Area of Concern.

Restrictions on Dredging Activities

Status: ***Impaired***

The presence of an estimated 110 000 m^3 of contaminated sediments in the harbour severely restricts maintenance dredging.

KEY ACTIONS

COMPLETED	REMAINING
▪ Launched *Port Hope Area Initiative* to clean up and manage the low-level radioactive waste ▪ Completed environmental assessment, regulatory review and licensing of long-term waste management facility and began detailed design ▪ Initiated environmental assessment of *Vision 2010* project to address removal and long-term storage of contaminated soil and waste material from site of existing uranium conversion facility	▪ Commence construction of a long-term low-level radioactive waste management facility in the municipality of Port Hope ▪ Begin cleaning up the contaminated sites in different locations within the municipality, including the harbour sediments ▪ Complete the environmental assessment of the Cameco plan to clean up the property site

FOR MORE INFORMATION

Port Hope Area Initiative:
www.phai.ca

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Spanish Harbour

Area in Recovery

Status of Beneficial Use Impairments

September 2010

Spanish Harbour is located on the North Channel of Lake Huron. The Area in Recovery covers the lower 52 km of the Spanish River, from the town of Espanola to the river mouth at the town of Spanish, and extends from the harbour area to the western end of Kirke and Green Islands in the Whalesback Channel. The Spanish River Delta Marsh is designated as a provincially significant wetland. The forestry industry is the largest employer in the area.

Environmental concerns in the Spanish Harbour Area in Recovery were linked to the impacts from the Espanola sewage treatment plant, past log-driving operations, effluent from the pulp and paper mill in Espanola (Domtar Inc. Eddy Specialty Papers; formerly E.B. Eddy Forest Products Ltd.), and discharges from past and ongoing mining, milling and smelting activities in the Sudbury area. The Vermilion River, which enters the Spanish River above Espanola, drains the Sudbury basin and carries contaminants from these and other sources into the Area in Recovery.

Ontario

Canada

PARTNERSHIPS IN ENVIRONMENTAL PROTECTION

Spanish Harbour was designated an Area of Concern in 1987 under the Canada–United States Great Lakes Water Quality Agreement. Areas of Concern are sites on the Great Lakes system where environmental quality is significantly degraded and beneficial uses are impaired. Currently, there are 9 such designated areas on the Canadian side of the Great Lakes, 25 in the United States, and 5 that are shared by both countries. In each Area of Concern, government, community and industry partners are undertaking a coordinated effort to restore environmental quality and beneficial uses through a remedial action plan.

Remedial Action Plan Partners

Environment Canada and the Ontario Ministry of the Environment coordinate the development and implementation of the remedial action plans to protect and restore these Areas of Concern in Canada. Other partners in the cooperative effort in the Spanish Harbour Area in Recovery include (in alphabetical order) the Anishinabek/Ontario Fisheries Resource Centre, Fisheries and Oceans Canada, fishing and hunting associations, Friends of the Spanish River, local industry, the Ontario Ministry of Natural Resources, and the Sagamok Anishnawbek Fisheries Department.

Remedial Action Plan Process

The Great Lakes Water Quality Agreement requires that remedial action plans be developed and implemented in three stages:

Stage 1: Identifying the Environmental Challenges

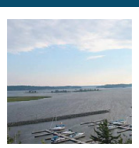
In Stage 1, the governments of Canada and Ontario, working with community stakeholders, undertook an extensive program of research and monitoring to assess environmental quality and identify the causes of degradation in the Area of Concern. The ***Stage 1 Remedial Action Plan Report***, summarizing the outcome of these efforts, was completed in 1993. The report identified nine environmental challenges needing to be addressed and known as *beneficial use impairments* in the remedial action plan process.

Stage 2: Planning and Implementing Remedial Actions

In Stage 2, the governments of Canada and Ontario, working with community stakeholders, undertook a detailed review of potential remedial actions to restore, protect and monitor environmental quality in the Area of Concern. The ***Stage 2 Remedial Action Plan Report***, which identified recommended remedial actions, was completed in 1999. That same year, Spanish Harbour was the first Area of Concern to be recognized by the federal and provincial governments as an *Area in Recovery*. All recommended restoration activities had been completed. Of the original nine *beneficial use impairments*, six were restored through implementation of the remedial actions, and only three remained designated as *impaired*. Natural recovery was expected to mitigate these impairments over time. The status of the remaining three beneficial use impairments are described below in **Progress on Environmental Challenges**.

Stage 3: Monitoring Actions and Delisting of the Area of Concern

The ***Stage 3 Remedial Action Plan Report*** and delisting of Spanish Harbour as an Area of Concern will be undertaken when monitoring confirms that the environmental challenges have been addressed successfully through the remedial actions. As of September 2010, there is no estimate of when the delisting will occur.



PROGRESS ON ENVIRONMENTAL CHALLENGES

Spanish Harbour was the first Area of Concern to be identified as an Area in Recovery, in recognition that six of the original nine environmental challenges had been successfully addressed by the Remedial Action Plan partners by 1999. The remaining three environmental challenges are related to metal contaminants from past and ongoing mining operations in the Sudbury area, upstream of the Area of Concern. These mining sources are being addressed by provincial programs outside the Area of Concern. A modelling study undertaken for the Remedial Action Plan partners concluded that it could take up to 40 years for the reduction of this pollutant load and natural recovery of the Spanish Harbour ecosystem to occur if reductions in upstream sources were reduced. Results from a 2008 metal loading rates survey will be used to provide a more accurate estimate of the expected recovery timeframe.

In addition, further monitoring is required to better understand the extent and risks of dioxin and furan contamination within sediment off Aird Island's north shore, just outside the Area of Recovery's boundary in the Whalesback Channel. The source of dioxins and furans was a bleaching process used at the Espanola pulp and paper mill. That process has not been used since the mid-1990s, thus virtually eliminating these substances entering waters in the Area in Recovery.

Status of Beneficial Use Impairments

The tables below summarize, for each of the three remaining beneficial use impairments in the Spanish Harbour Area in Recovery, their status as of September 2010; key actions taken by various partner agencies and organizations under the Remedial Action Plan; and future key actions planned by the partners as they work towards the full restoration of environmental quality and eventual delisting of the Area of Concern.

Status – IMPAIRED

Degradation of Benthos[1]

Status: ***Impaired***

Monitoring confirmed impairment of the benthic community structure, with decreased abundance and diversity at most test sites due to high metal concentrations, as well as high dioxin and furan levels in parts of the Whalesback Channel, just outside the Area in Recovery's boundary.

KEY ACTIONS

COMPLETED	REMAINING
▪ Completed benthic and water studies to provide information on the extent of contaminated sediment in the Area in Recovery (2003, 2005 and 2009) ▪ Undertook modelling of nickel and copper loading from upstream sources that concluded it would take 10 to 50 years for levels in the Area in Recovery to meet provincial guidelines if a 5% annual reduction in loadings were to occur (2006) ▪ Conducted survey of the loading rates for nickel and copper (2008) ▪ Implemented federal pulp and paper regulations and the provincial Municipal/ Industrial Strategy for Abatement (MISA) regulations in the mid-1990s, which eliminated persistent toxic substances and addressed other problems associated with industrial discharges entering the Spanish River ▪ Completed upgrades at the Espanola paper mill between 1988 and 1999 to move away from chlorine bleaching, resulting in the virtual elimination of dioxins and furans entering the environment	▪ Review 2009 benthic assessment of sediment toxicity assessment ▪ Undertake sampling in the Spanish River and Whalesback Channel to better characterize sediment chemistry and ecological risks ▪ Review results of the 2008 metals loading survey ▪ Prepare an Area in Recovery Status Report outlining the current status of the environmental challenges, proposed delisting criteria and a comprehensive monitoring plan to track recovery

[1] *Benthos* and *benthic community* refer to the invertebrate organisms, such as worms, nymphs and insect larvae that dwell for all or part of their lives in the bottom sediments of lakes and rivers. Scientists often use the health and abundance of these organisms as indicators of contaminant toxicity and ecosystem health.

Restrictions on Dredging Activities

Status: ***Impaired***

Dredging of sediment from the nearshore zone downstream of the mouth of the Spanish River is restricted due to elevated levels of metals that exceed provincial open water disposal guidelines.

KEY ACTIONS

COMPLETED	REMAINING
▪ Completed benthic and water studies to provide information on the extent of contaminated sediment in the Area in Recovery (2003, 2005 and 2009)	▪ Evaluate the prospects and benefits of developing an administrative controls document for the area to ensure future dredging is conducted in accordance with provincial and federal guidelines ▪ Prepare an area in recovery status report and a long-term monitoring plan to track progress

Restrictions on Fish and Wildlife Consumption

Status: ***Impaired***

Restricted consumption of Brown Bullhead, White Sucker, Ling, Smallmouth Bass, Yellow Perch, Whitefish, Channel Catfish and Large Walleye is advised due to elevated levels of mercury, dioxins and furans. Potential risk to humans is mitigated by adhering to provincial sport fish consumption guidelines.

KEY ACTIONS

COMPLETED	REMAINING
▪ Issued fish consumption advisories for Spanish Harbour and Whalesback Channel as part of the larger North Channel area, due to dioxins, mercury and dioxin-like PCBs[2] ▪ Issued a consumption restriction advisory for Walleye from the Spanish River downstream of Espanola due to elevated levels of dioxins; the source of dioxins was a bleaching process at the pulp and paper mill that was eliminated in the mid-1990s	▪ Review data from the recent sport fish survey and collect and analyze additional fish from Whaleback Channel to characterize the extent of the local sport fish issues—i.e., assess whether advisories for Spanish Harbour are due to local sources, and whether they are more stringent than those advisories issued for open water in Lake Huron ▪ Prepare an area in recovery status report and a long-term monitoring plan to track progress

[2] *Polychlorinated biphenyls* (PCBs) are synthetic chemicals that have wide industrial applications. The manufacturing and importing of PCBs were banned in North America in 1977. PCBs are very persistent (long-lasting) in the environment and can be transported over long distances.

FOR MORE INFORMATION

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www.ec.gc.ca/raps-pas

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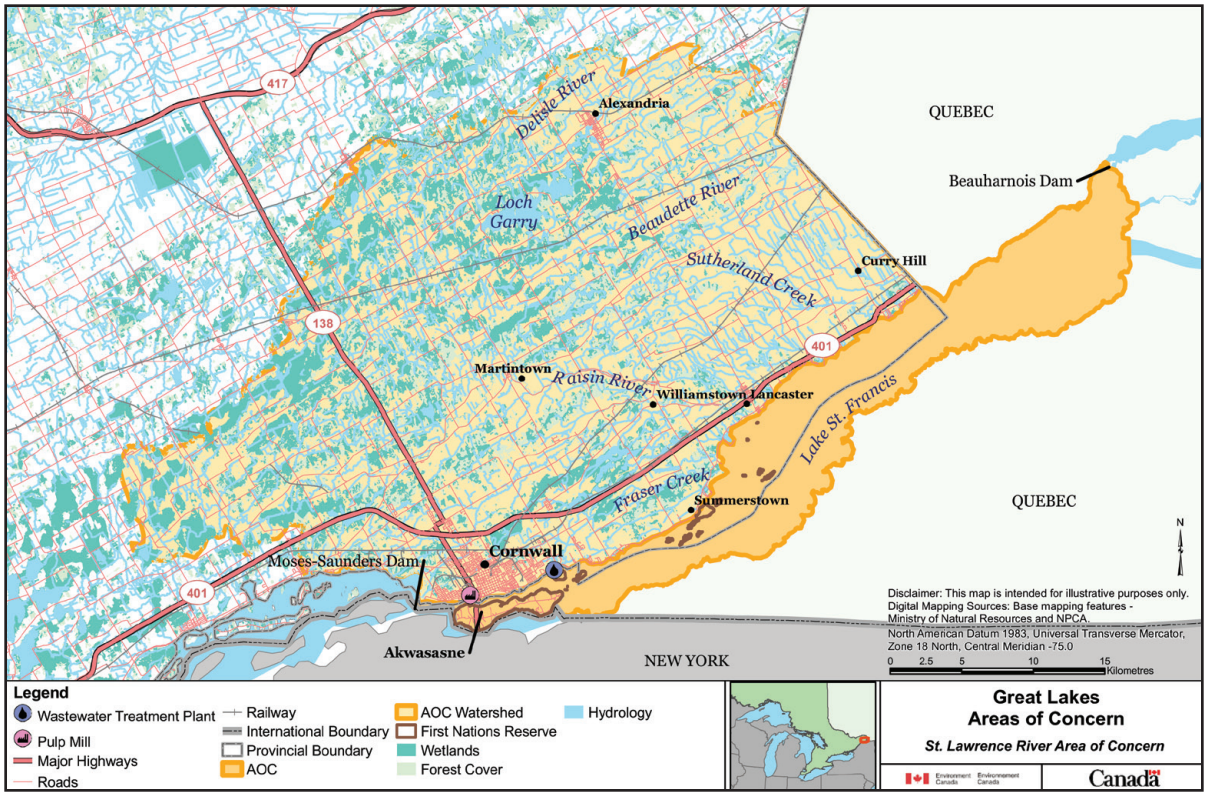
St. Lawrence River
Area of Concern
Canadian Section
Status of Beneficial Use Impairments
September 2010

The St. Lawrence River drains the Great Lakes and is among the largest rivers in the world. The Area of Concern includes a stretch of the St. Lawrence River approximately 80 km long, from the Moses-Saunders power dam (just upstream of Cornwall, Ontario) to the eastern outlet of Lake St. Francis, in Quebec. It is a complex jurisdictional area involving Canada, United States, Ontario, Quebec, New York State and Mohawks of Akwesasne interests. The Area of Concern's watershed, which includes tributaries of the St. Lawrence along this stretch, is mainly agricultural land and woodland. The largest urban area is the City of Cornwall, Ontario.

The Cornwall waterfront has been the location of industrial activities for more than 100 years. Although many of the contaminant sources have been eliminated, past discharges continue to impact the aquatic environment, as contaminated sediment and organisms transfer mercury and other metals to other components of the environment. Local contaminant sources include industrial and municipal discharges, and diffuse sources such as urban stormwater and agricultural runoff. Contaminants also enter the Area of Concern from upstream in the Great Lakes system via Lake Ontario and, finally, from air deposition. Land use practices, shipping and the extensive shoreline and water flow alterations that resulted from the construction of the St. Lawrence Seaway also have altered the natural features of the Area of Concern.



Ontario

Canada

PARTNERSHIPS IN ENVIRONMENTAL PROTECTION

The St. Lawrence River was designated an Area of Concern in 1987 under the Canada–United States Great Lakes Water Quality Agreement. Areas of Concern are sites on the Great Lakes system where environmental quality is significantly degraded and beneficial uses are impaired. Currently, there are 9 such designated areas on the Canadian side of the Great Lakes, 25 in the United States, and 5 (including the St. Lawrence River) that are shared by both countries. In each Area of Concern, government, community and industry partners are undertaking a coordinated effort to restore environmental quality and beneficial uses through a remedial action plan.

Remedial Action Plan Partners

Responsibility for the St. Lawrence River Area of Concern is shared jointly by both Canada and the United States. Remedial action plans have been developed and implemented independently in Ontario and New York State, in partnership with the respective local communities.

Environment Canada and the Ontario Ministry of the Environment coordinate the development and implementation of the remedial action plans to protect and restore these Areas of Concern in Canada. Since 1998, the St. Lawrence River Restoration Council has served as the implementation group for the St. Lawrence Remedial Action Plan. Partners in this cooperative effort include (in alphabetical order) the City of Cornwall, the Cornwall and District Environment Committee, the Cornwall Chamber of Commerce, Cornwall Chemicals Ltd., Domtar Inc., the Eastern Ontario Health Unit, Environment Canada, Fisheries and Oceans Canada, the Glengarry Federation of Agriculture, ICI Canada, the Mohawks of Akwesasne, the Ontario Ministry of the Environment, the Ontario Ministry of Natural Resources, Ontario Power Generation, the Raisin Region Conservation Authority, the Resources Stewardship Council Stormont, Dundas and Glengarry, the Rotary Club of Cornwall, the St. Lawrence River Institute of Environmental Sciences, the Township of North Glengarry, and Township of South Glengarry. Local industry and private landowners also have been involved extensively throughout the Remedial Action Plan process.

Remedial Action Plan Process

The Great Lakes Water Quality Agreement requires that remedial action plans be developed and implemented in three stages:

Stage 1: Identifying the Environmental Challenges

In Stage 1, the governments of Canada and Ontario, working with community stakeholders, undertook an extensive program of research and monitoring to assess environmental quality and identify the causes of degradation in the Area of Concern. The ***Stage 1 Remedial Action Plan Report***, summarizing the outcome of these efforts, was completed in 1992. The report identified 10 environmental challenges needing to be addressed and known as *beneficial use impairments* in the Remedial Action Plan process. Their current status is described below in **Progress on Environmental Challenges**.

Stage 2: Planning and Implementing Remedial Actions

In Stage 2, the governments of Canada and Ontario, working with community stakeholders, undertook a detailed review of potential remedial actions to restore, protect and monitor environmental quality in the Area of Concern. The ***Stage 2 Remedial Action Plan Report***, which identified 64 recommended remedial actions, was completed in 1997. An update to the report, identifying those recommended actions still to be implemented, was completed in 2008.

Stage 3: Monitoring Actions and Delisting of the Area of Concern

All priority actions for delisting have been implemented. The ***Stage 3 Remedial Action Plan Report***, on the results of monitoring efforts to determine whether the environmental challenges have been addressed successfully through the remedial actions, is being prepared. However, as of September 2010, a decision on whether to delist the Canadian section of the St. Lawrence River Area of Concern has not been made.

PROGRESS ON ENVIRONMENTAL CHALLENGES

The federal and provincial governments and partners have made significant progress in addressing the environmental challenges in the Area of Concern, particularly in the areas of fish and wildlife habitat protection and restoration, reduction of runoff from rural non-point sources, and reduction of discharges from municipal and industrial sources. Their accomplishments include the Cornwall Pollution Control Plan, the decommissioning of the industrial sites on the river, the development of fisheries management plans for the river, tributaries and Lake St. Francis, many littoral zone and wetland restoration or habitat enhancement projects and the development and implementation of the Cornwall Sediment Management Strategy.

All priority actions for delisting have been implemented. In June, July and September 2010, the St. Lawrence River Restoration Council members have been consulting local groups on the subject of delisting the Area of Concern. However, as of September 2010, a decision on whether to delist the Canadian side of the St. Lawrence River Area of Concern has not been made.

Status of Beneficial Use Impairments

The tables below summarize, for each of the 10 beneficial use impairments for the St. Lawrence River Area of Concern, their status as of September 2010; key actions taken by various partner agencies and organizations under the Remedial Action Plan; and future key actions planned by the partners as they work towards the full restoration of environmental quality and eventual delisting of the Area of Concern.

Status – IMPAIRED

Eutrophication[1] or Undesirable Algae

Status: ***Impaired, in tributaries of the St. Lawrence River and Lake St. Francis nearshore*** (*Not impaired* in the St. Lawrence River main channel and in the Lake St. Francis offshore)

Levels of phosphorous in tributaries of the river and in the nearshore of Lake St. Francis have declined over time; they however remain above water quality guidelines, but are similar to other St. Lawrence River tributaries.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Implemented environmental farm plans and tributary restoration program to reduce agricultural runoff; this work involved fencing to restrict cattle from watercourses, upgrades to milkhouse washwater facilities, manure storage facilities and rural septic systems; and tree planting along riverbanks ▪ Implemented the *Nutrient Management Act* that prescribes nutrient management planning requirements to reduce agricultural runoff ▪ Developed and implemented a pollution prevention and control plan for the City of Cornwall, reducing the number of combined sewers and combined sewer overflow events ▪ Put in place funding for upgrading the City of Cornwall's wastewater treatment plant, which will reduce nutrient loading to the St. Lawrence River ▪ Completed the Fly Creek Stormwater Pond Retrofit Plan to ensure treatment of municipal stormwater before discharging to the St. Lawrence River	▪ Continue to implement watershed management programs

[1] *Eutrophication* (or *eutrophic conditions*) is the process by which lakes and other water bodies are enriched by nutrients (usually phosphorus and nitrogen), which leads to excessive plant growth and oxygen depletion.

Loss of Fish and Wildlife Habitat

Status: ***Impaired***

While some of the Remedial Action Plan delisting criteria for fish and wildlife habitat have been met, the targets for wetlands and forests likely are not achievable in either the short or long term, due to land use and development patterns.

KEY ACTIONS

COMPLETED	REMAINING
▪ Developed and adopted the Natural Heritage Strategy designed to protect and enhance terrestrial habitat ▪ Completed stream assessments for severely degraded streams ▪ Implemented a tributary restoration program to protect and restore fish and wildlife habitat; work involved fencing to restrict cattle from watercourses and tree planting along riverbanks ▪ Constructed nearshore fish spawning and nursery reefs along the Cornwall waterfront	▪ Continue to implement watershed management programs and Natural Heritage Strategy ▪ Continue to support Resource Stewardship Councils and certified forest owners to protect and restore habitat ▪ Implement fish habitat management plans

Restrictions on Fish and Wildlife Consumption

Status: ***Impaired, for fish consumtion***

Restricted consumption of Walleye, Yellow Perch and other species of fish is advised due to elevated levels of mercury. While mercury levels in fish have declined over time, it is expected that decades will be required to fully restore this beneficial use due to widespread, low-level mercury contamination in the sediments throughout the northern reaches of the Area of Concern and ongoing natural sources.

KEY ACTIONS

COMPLETED	REMAINING
▪ Eliminated all industrial discharges containing mercury ▪ Completed the Cornwall Sediment Strategy (2005), and established an administrative controls protocol to protect deeper sediments from disturbance by any future waterfront development ▪ Completed the mercury track-down initiative to identify fugitive sources of mercury ▪ Implemented federal and provincial legislation to regulate industrial discharges	▪ Continue to implement the Cornwall Sediment Strategy and administrative controls protocol ▪ Maintain monitoring of sport fish and the status of sediment quality ▪ Address fugitive sources of mercury if any are observed in future

Status – NOT IMPAIRED

Four environmental challenges have been designated as *not impaired*, following implementation of remedial actions.

Beach Closings

Status: ***Not Impaired***

Historically, there have been an excessive number of posted advisories that bacterial levels (*E. coli*) exceeded safe levels for swimming and other body contact recreational activities at several recreational areas within the Area of Concern. Since the 1980s, there have been substantial improvements in *E. coli* levels along the Cornwall waterfront and in Lake St. Francis. Data from the last few years indicate that water quality meets Beach Closings delisting criteria, though there still are several non-swimming areas where levels occasionally exceed provincial limits for the protection of human health.

KEY ACTIONS

COMPLETED	REMAINING
▪ Developed and implemented a pollution prevention and control plan for the City of Cornwall that reduced the number of combined sewers and combined sewer overflow events ▪ Implemented septic system re-inspection program to reduce runoffs from septic systems (2008) ▪ Implemented the Eastern Ontario Health Unit beach monitoring program	▪ Conduct additional sampling at sites where high bacterial levels occasionally occur, and apply remedial actions if required ▪ Continue to implement the Eastern Ontario Health Unit beach monitoring program

Degradation of Benthos[2]

Status: ***Not Impaired***

Benthic community structure, diversity and abundance along the Cornwall waterfront are no different than upstream or appropriate reference sites. Monitoring has confirmed no impairment of benthic community structure, no chronic or acute toxicity risk to benthos, and no risk of biomagnifications.[3]

KEY ACTIONS

COMPLETED	REMAINING
▪ Eliminated all industrial discharges along the Cornwall waterfront ▪ Completed the Cornwall Sediment Strategy (2005), and established an administrative controls protocol to protect deeper sediments from disturbance by any future waterfront development ▪ Implemented federal and provincial legislation to regulate industrial discharges	▪ Continue to implement the Cornwall Sediment Strategy and administrative controls protocol ▪ Maintain monitoring of sediment quality and benthic community

[2] *Benthos* and *benthic community* refer to the invertebrate organisms, such as worms, nymphs and insect larvae that dwell for all or part of their lives in the bottom sediments of lakes and rivers. Scientists often use the health and abundance of these organisms as indicators of contaminant toxicity and ecosystem health.

[3] *Biomagnification* is the increasing concentration of a substance, such as a toxic chemical, in the tissues of organisms at successively higher levels in a food chain. As a result, organisms at the top of the food chain generally suffer greater harm from a persistent pollutant than those at lower levels.

Degradation of Fish and Wildlife Populations

Status: ***Not Impaired***

KEY ACTIONS

COMPLETED	REMAINING
▪ Addressed recovery of Perch populations through implementation of the Lake St. Francis Fisheries Management Plan, reducing daily catch limits, and disallowing the sale of angler-caught Perch ▪ Restored fish populations through enhancement of fish habitat under the Cornwall littoral zone restoration ▪ Completed recovery plans for fish community and some individual species, including Walleye, Muskellunge and Sturgeon	▪ Continue to monitor fish community populations to ensure recovery is maintained ▪ Implement fish community and individual species recovery plans

Restrictions on Dredging Activities

Status: ***Not Impaired***

There is currently no navigational dredging which occurs in the Area of Concern along the Cornwall waterfront.

KEY ACTIONS

COMPLETED	REMAINING
▪ Completed the Cornwall Sediment Strategy (2005), and established an administrative controls protocol to protect deeper sediments from disturbance by any future waterfront development	▪ Continue to implement the Cornwall Sediment Strategy and administrative controls protocol ▪ Continue monitoring sediment quality

Three additional environmental challenges, thought to be possibly impaired, have been designated as *not impaired*, following further assessment.

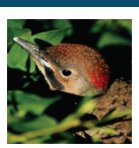
Bird (or Other Animal) Deformities or Reproduction Problems

Status: ***Not Impaired***

Assessments completed on Snapping Turtles, colonial waterbirds and Mink found no significant differences in contaminant levels, deformities or reproductive success compared to reference sites.

KEY ACTIONS

COMPLETED	REMAINING
▪ Implemented federal pulp and paper regulations and the provincial Municipal/ Industrial Strategy for Abatement (MISA) regulations in the mid-1990s, which led to process changes and upgrades to wastewater treatment at area pulp and paper mills ▪ Eliminated dioxins and furans in pulp mill discharges, following implementation of pulp and paper regulations	▪ No further action planned



Degradation of Phytoplankton and Zooplankton[4] Populations

Status: ***Not Impaired***

A 2005 study of phytoplankton and zooplankton communities within the Area of Concern found no impairment and no difference from upstream or downstream communities.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Conducted phytoplankton and zooplankton study	▪ No further action planned

Fish Tumours or Other Deformities

Status: ***Not Impaired***

Studies of liver tumours in Brown Bullhead from the Area of Concern indicated that the tumour prevalence was not significantly different from that in reference locations outside the area.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Conducted studies of liver tumours in Brown Bullhead	▪ No further action planned

[4] *Phytoplankton* and *zooplankton* are the collection of small or microscopic water-borne plant and animal organisms (respectively) that float or drift in great numbers, especially at or near the water's surface, and that serve as food for fish and other larger organisms.

FOR MORE INFORMATION

Environment Canada:
www.ec.gc.ca/raps-pas

Raisin Region Conservation Authority:
www.rrca.on.ca/view.php?id=39

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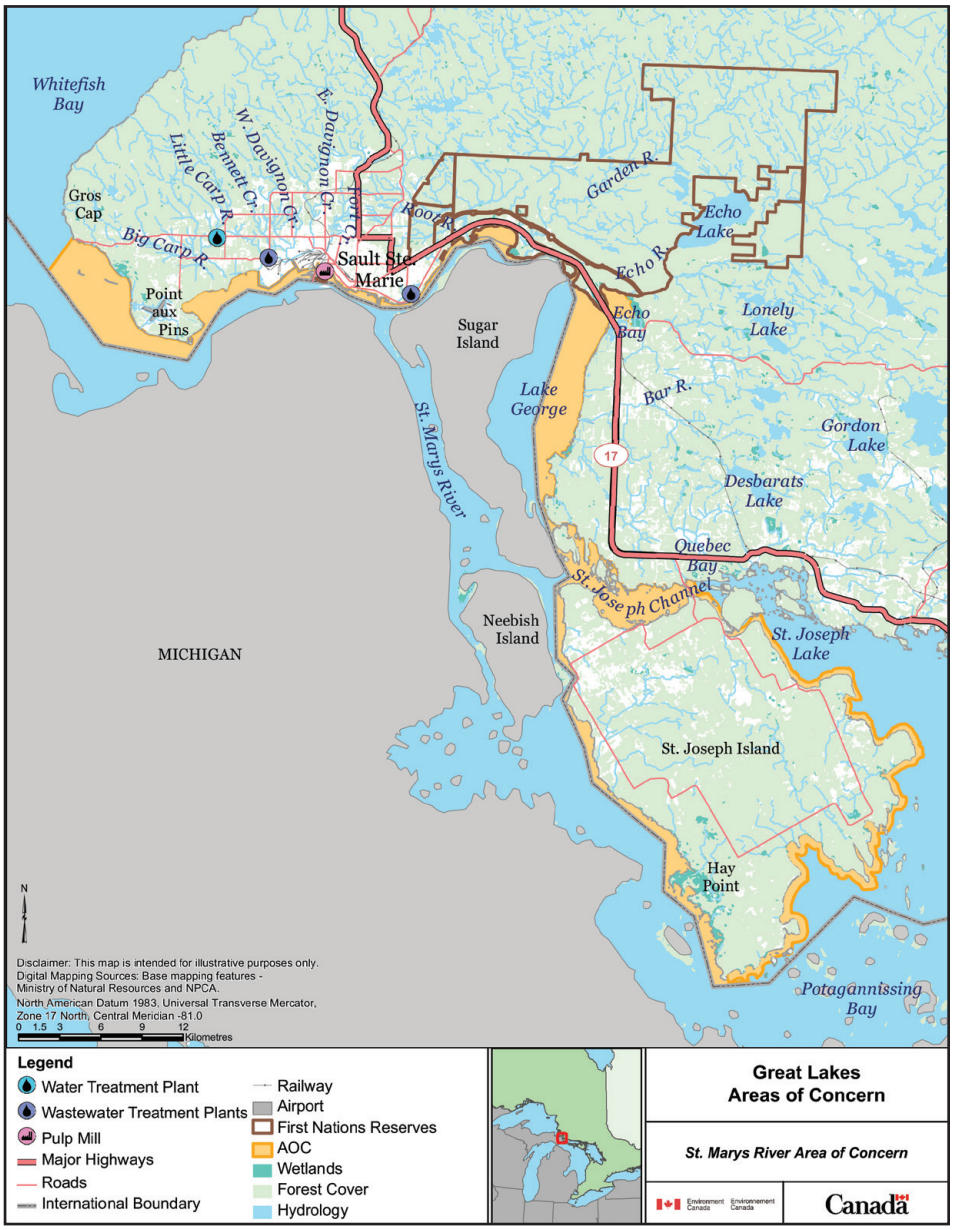
St. Marys River
Area of Concern
Canadian Section
Status of Beneficial Use Impairments
September 2010

The St. Marys River is a 112-km international channel that flows from Lake Superior into the North Channel of Lake Huron. The Area of Concern extends approximately two thirds of the river, from its head at Whitefish Bay downstream to St. Joseph Island. The river is a key part of the Great Lakes–St. Lawrence Seaway, with flow control structures and locks to allow for ship navigation between the lakes. The river's watershed and wetlands provide habitat for numerous fish and wildlife species, and support one of the highest concentrations of biodiversity in the Great Lakes basin. The largest communities in the area are the Canadian and United States cities of Sault Ste. Marie, which serve as industrial, commercial and institutional centres.

Environmental concerns in the St. Marys River Area of Concern include impacts on water quality and river sediment from discharges of effluent from local steel and pulp and paper industries, as well as discharges from municipal storm sewers and wastewater treatment plants. While improvements in the treatment of municipal wastewater and industrial effluent have significantly reduced the water quality impacts, bottom sediments along parts of the river remain contaminated due to a century of industrial activity. In addition, there are impacts to fish and wildlife habitat due to shoreline alteration, industrialization, urban development and shipping activities, and the infestation of Sea Lamprey (an alien invasive species).



Ontario

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PARTNERSHIPS IN ENVIRONMENTAL PROTECTION

The St. Marys River was designated an Area of Concern in 1987 under the Canada–United States Great Lakes Water Quality Agreement. Areas of Concern are sites on the Great Lakes system where environmental quality is significantly degraded and beneficial uses are impaired. Currently, there are 9 such designated areas on the Canadian side of the Great Lakes, 25 in the United States, and 5 (including the St. Marys River) that are shared by both countries. In each Area of Concern, government, community and industry partners are undertaking a coordinated effort to restore environmental quality and beneficial uses through a remedial action plan.

Remedial Action Plan Partners

Responsibility for the St. Marys River Area of Concern is shared jointly by both Canada and the United States. In 1998, Environment Canada, the U.S. Environmental Protection Agency, the Ontario Ministry of the Environment and the Michigan Department of Environmental Quality (now the Department of Natural Resources and Environment) signed the Four Agency Letter of Commitment. The Letter outlined agency roles and responsibilities during implementation of the remedial action plans for three binational Areas of Concern—the St. Marys River, the Detroit River and the St. Clair River.

On the Canadian side of the St. Marys River, Environment Canada and the Ontario Ministry of the Environment coordinate the development and implementation of the remedial action plan to protect and restore this Area of Concern. Other partners in the cooperative effort include (in alphabetical order) the Algoma Health Unit, the Binational Public Advisory Council, the City of Sault Ste. Marie (Ontario), Fisheries and Oceans Canada, the Garden River First Nation, local industry (including Essar-Algoma Steel), the Ontario Ministry of Natural Resources, and the Sault Ste. Marie Region Conservation Authority.

Remedial Action Plan Process

The Great Lakes Water Quality Agreement requires that remedial action plans be developed and implemented in three stages:

Stage 1: Identifying the Environmental Challenges

In Stage 1, the governments of Canada, Ontario, the United States and the State of Michigan, working with community stakeholders, undertook an extensive program of research and monitoring to assess environmental quality and identify the causes of degradation in the Area of Concern. The ***Stage 1 Remedial Action Plan Report***, summarizing the outcome of these efforts, was completed in 1992. It pointed to past and ongoing industrial activities, municipal storm and wastewater effluent, the water control structure and shipping activity, and urban development as being primary causes for environmental concerns.

Stage 2: Planning and Implementing Remedial Actions

In Stage 2, the governments of Canada, Ontario, the United States and the State of Michigan, working with community stakeholders, undertook a detailed review of potential remedial actions to restore, protect and monitor environmental quality in both the Canadian and United States sections of the Area of Concern. The ***Stage 2 Remedial Action Plan Report***, which identified 10 environmental challenges known as *beneficial use impairments* in the Remedial Action Plan process, was completed in 2002. The report identified more than 60 recommended remedial actions. The Implementation Annex, which outlines the roles and responsibilities and costs and timelines for implementing the remaining priority actions, will be completed in 2011. The current status of the beneficial use impairments is described below in **Progress on Environmental Challenges**.

Stage 3: Monitoring Actions and Delisting of the Area of Concern

The ***Stage 3 Remedial Action Plan Report*** and delisting of St. Marys River as an Area of Concern will take place when monitoring confirms that the environmental challenges have been addressed successfully through the remedial actions. Several priority actions remain to be completed with respect to contaminated sediment, municipal stormwater and habitat restoration. As of summer 2010, agencies are assessing whether management of contaminated sediments is required. There is no estimate yet of when the St. Marys River will be delisted as an Area of Concern.

PROGRESS ON ENVIRONMENTAL CHALLENGES

The federal and provincial governments and partners have made substantial progress in addressing the environmental challenges in the Area of Concern. Notable successes have included upgrading the main wastewater treatment plant to secondary treatment in Sault Ste. Marie (Ontario), which has significantly improved the quality of effluent entering the river. In addition, with federal and provincial support, the city undertook an investigative study to reduce untreated stormwater outflows into the St. Marys River, which will help to further improve the river's water quality. Other achievements include the development of wetland protection strategies, fostering the recovery of Walleye populations and supporting the design of habitat features in the city's waterfront development.

Future efforts will need to focus on sediment management concerns. The partners are currently assessing the need for a sediment management plan. If such action is needed, then sediment management options will be evaluated and a detailed engineering design and environmental assessment of the preferred option will be undertaken. The earliest that a sediment management plan could be implemented is 2013. Other concerns include the impacts to fish habitat caused by the operations at the Compensating Works that control water levels and flows over the rapids.

Status of Beneficial Use Impairments

The tables below summarize, for each of the 10 beneficial use impairments in the St. Marys River Area of Concern (Canadian section), their status as of September 2010; key actions taken by various partner agencies and organizations under the Remedial Action Plan; and future key actions planned by the partners as they work towards the full restoration of environmental quality and eventual delisting of the Area of Concern.

Status – IMPAIRED

Beach Closings

Status: ***Impaired***

There were a number of reports about floating material washing up on shoreline property and beaches along the north shore of Sugar Island, often accompanied by high levels of *E. coli* in the surrounding water in some areas.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Upgraded the East End sewage treatment plant to secondary treatment and relocated the effluent outfall (2006) ▪ Undertook a stormwater management study for Sault Ste. Marie (Ontario) to improve quality of urban runoff to the river (2009–2010) ▪ The binational Sugar Island Monitoring Working Group initiated weekly monitoring and analysis of water and floating material, which pointed to natural causes (algae) and stormwater outfalls as the problem source (2007–2009)	▪ Identify and implement restoration actions related to stormwater management to address high bacteria counts following rain events ▪ Revise delisting criteria to include measurable targets and develop the Implementation Annex to identify and evaluate remaining priority actions

Degradation of Aesthetics

Status: ***Impaired***

Aesthetics were deemed degraded as a result of oil slicks downstream of the steel mill and from spills from passing ships. In the past, oily, fibrous material mixed with woody debris was reported along the Ontario shoreline. Related to Beach Closings above, there have been episodes of floating material along the north shore of Sugar Island and the Ontario shoreline of Lake George Channel.

KEY ACTIONS

COMPLETED	REMAINING
▪ Upgraded wastewater treatment at the Essar Algoma Steel mill and the St. Marys Paper mill, substantially improving effluent quality ▪ Decommissioned the Essar-Algoma Steel Terminal Basin settling ponds, reducing discharges into the river ▪ Upgraded the East End sewage treatment plant to secondary treatment and relocated the effluent outfall (2006) ▪ Initiated weekly monitoring and analysis of water and floating material through the binational Sugar Island Monitoring Working Group, which pointed to natural causes (algae) and stormwater outfalls as the problem source (2007–2009)	▪ See Beach Closings above

Degradation of Benthos[1]

Status: ***Impaired***

Monitoring has confirmed impairment of the benthic community structure within the area downstream of the Algoma slag site to a distance of about 4 km, and on both sides of the Lake George Channel, within Little Lake George, and at the north end of Lake George.

KEY ACTIONS

COMPLETED	REMAINING
▪ Implemented federal pulp and paper regulations and the provincial Municipal/Industrial Strategy for Abatement (MISA) regulations in the mid-1990s, which eliminated persistent toxic substances and addressed other problems associated with industrial discharges entering the St. Marys River ▪ Removed much of the contaminants at the Algoma slip site through maintenance dredging (1995, 2006) ▪ Conducted studies of sediment chemistry, toxicity and benthic communities to define the area of sediment contamination (2006, 2008, 2009) ▪ Commenced a modelling study to determine sediment fate and transport under different hydrologic conditions (2009–2010)	▪ Complete studies on sediment stability, fate and transport to determine the need for sediment management and, if needed, assess options and implement the preferred option ▪ Revise delisting criteria to include measurable targets

[1] *Benthos* and *benthic community* refer to the invertebrate organisms, such as worms, nymphs and insect larvae that dwell for all or part of their lives in the bottom sediments of lakes and rivers. Scientists often use the health and abundance of these organisms as indicators of contaminant toxicity and ecosystem health.

Degradation of Fish and Wildlife Populations

Status: ***Impaired***

Concerns for the fish community were: trends of lower Cisco abundance; the status of specific spawning stocks of walleye within the river; the potential for exotic, invasive species to invade the fish community; and declining populations of Northern Pike.

Waterfowl populations may be adversely affected by elevated concentrations of mercury and PCBs.[2]

KEY ACTIONS

COMPLETED	REMAINING
▪ Supported work of the St. Marys River Fisheries Task Group, made up of fish management agencies from Ontario and Michigan, towards sustainable fisheries in the St. Marys River, including fish population surveys, harvest surveys and a fisheries assessment plan	▪ Determine need for assessment of impacts to waterbird and wildlife populations from shoreline development ▪ Undertake assessment of actions related to contaminant levels of waterfowl populations ▪ Develop local fish community objectives ▪ Revise delisting criteria to include measurable targets and develop the Implementation Annex to identify and evaluate remaining priority actions

Eutrophication[3] or Undesirable Algae

Status: ***Impaired***

Eutrophication and algae were an issue in the vicinity of the East End sewage treatment plant before it was upgraded to secondary treatment in 2006. Conditions in smaller bays and in slow moving parts of the river downstream from the plant have not been documented.

KEY ACTIONS

COMPLETED	REMAINING
▪ See Beach Closings above	▪ See Beach Closings above

[2] *Polychlorinated biphenyls* (PCBs) are synthetic chemicals that have wide industrial applications. The manufacturing and importing of PCBs were banned in North America in 1977. PCBs are very persistent (long-lasting) in the environment and can be transported over long distances.

[3] *Eutrophication* (or *eutrophic conditions*) is the process by which lakes and other water bodies are enriched by nutrients (usually phosphorus and nitrogen), which leads to excessive plant growth and oxygen depletion.

Fish Tumours or Other Deformities

Status: ***Impaired***

Earlier surveys showed the presence of liver tumours in White Suckers sampled below the power dam on the St. Marys River. Brown Bullheads sampled from Munuscong Bay (Michigan) showed incidence of liver tumours.

KEY ACTIONS

COMPLETED	REMAINING
▪ Reduced contaminant discharges from industrial sources ▪ Completed secondary treatment upgrades of mill effluent at Essar Algoma Steel and St. Marys Paper, which are expected to lead to declines in pollution (e.g., resin acids) and improved water quality ▪ Completed field study to compare tumour incidence in White Suckers within the Area of Concern with suitable reference areas (2009)	▪ Analyze collected White Sucker samples for comparison to suitable reference sites ▪ Revise delisting criteria to include measurable targets, and develop the Implementation Annex to identify and evaluate remaining priority actions

Loss of Fish and Wildlife Habitat

Status: ***Impaired***

Significant loss of fish and wildlife habitat has occurred as a result of shoreline alteration, industrialization, urbanization and shipping activities, particularly within and immediately above and below the St. Marys rapids. The flow regime resulting from the present operation of the gated, flow-control structure at the head of the rapids has resulted in changes to the biological integrity and productive potential of the remaining rapids habitat. Specific habitats throughout the river are also threatened by colonization of exotic, invasive species.

KEY ACTIONS

COMPLETED	REMAINING
▪ Undertook a range of habitat protection and restoration work, including the addition of spawning habitat to the Big Rapids, creating a buffer strip along the shoreline to prevent livestock access to the St. Marys River, and reducing sedimentation along the Bar River, a major spawning tributary used by Walleye ▪ Completed a wetland inventory for inclusion in the Official Municipal Plan of Sault Ste. Marie, Ontario (2005–2006) ▪ Surveyed river for fish community response to nearshore habitat modification (2003–2004) and assessed fish community using a biotic integrity index (2009)	▪ Revise delisting criteria to include measurable targets and develop Implementation Annex to identify and evaluate remaining priority actions

Restrictions on Dredging Activities

Status: ***Impaired***

Dredging of sediments may be restricted due to elevated levels of PAHs,[4] PCBs, metals, oil and grease and organics in numerous locations, including adjacent to the Algoma slag dump site along the Ontario shore, on both sides of Lake George Channel, in Little Lake George, and in the northern half of Lake George.

KEY ACTIONS

COMPLETED	REMAINING
▪ Reduced contaminant discharges to the river from the steel mill and paper mill through improved treatment following introduction of federal pulp and paper regulations and the provincial Municipal/Industrial Strategy for Abatement regulations (MISA) in the mid-1990s ▪ Removed much of the contaminants at the Algoma slip site through maintenance dredging (1995, 2006)	▪ Determine the need for sediment management and, if needed, assess options and implement the preferred option

Restrictions on Fish and Wildlife Consumption

Status: ***Impaired, for fish consumption***

Restricted consumption of Walleye, White Suckers is advised due to elevated levels of mercury and PCBs.

KEY ACTIONS

COMPLETED	REMAINING
▪ Implemented federal pulp and paper regulations and the provincial Municipal/Industrial Strategy for Abatement (MISA) regulations in the mid-1990s, which eliminated persistent toxic substances and addressed other problems associated with industrial discharges entering the St. Marys River ▪ Eliminated all industrial discharges containing mercury ▪ Completed secondary treatment upgrades of mill effluent at Essar Algoma Steel and St. Marys Paper, which are expected to lead to declines in contaminants and improved water quality ▪ Collected fish tissue samples to assess contamination levels (2009)	▪ Assess results of recent sampling studies of Lake Herring and whether the consumption advisories for St. Marys River are due to local sources ▪ Revise delisting criteria to include measurable targets and develop Implementation Annex to identify and evaluate remaining priority actions

[4] *Polycyclic aromatic hydrocarbons* (PAHs) are chemical compounds found in oil, coal, and tar deposits, and that also are produced as byproducts of fuel burning (whether fossil fuel or biomass). As pollutants, they are of concern because some compounds have been identified as carcinogenic.

Status – REQUIRES FURTHER ASSESSMENT

Bird (or Other Animal) Deformities or Reproduction Problems

Status: ***Requires further assessment***

While a full assessment of bird and animal populations and appropriate reference conditions has not been undertaken, researchers in 1998 identified deformities in three Common Tern chicks.

KEY ACTIONS

COMPLETED	REMAINING
▪ Undertook several waterbird surveys on the St. Marys River in the early 1990s, including for Common and Black Terns and Osprey, that reported no tumours, though results regarding reproduction were not clear	▪ Assess the recommendation in the Stage 2 Remedial Action Plan Report that reproductive assessments of Herring Gulls, Black Terns, and Common Terns should be done within the Area of Concern's boundary and that deformities should be assessed in common terns inhabiting the St. Marys River

FOR MORE INFORMATION

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www.ec.gc.ca/raps-pas

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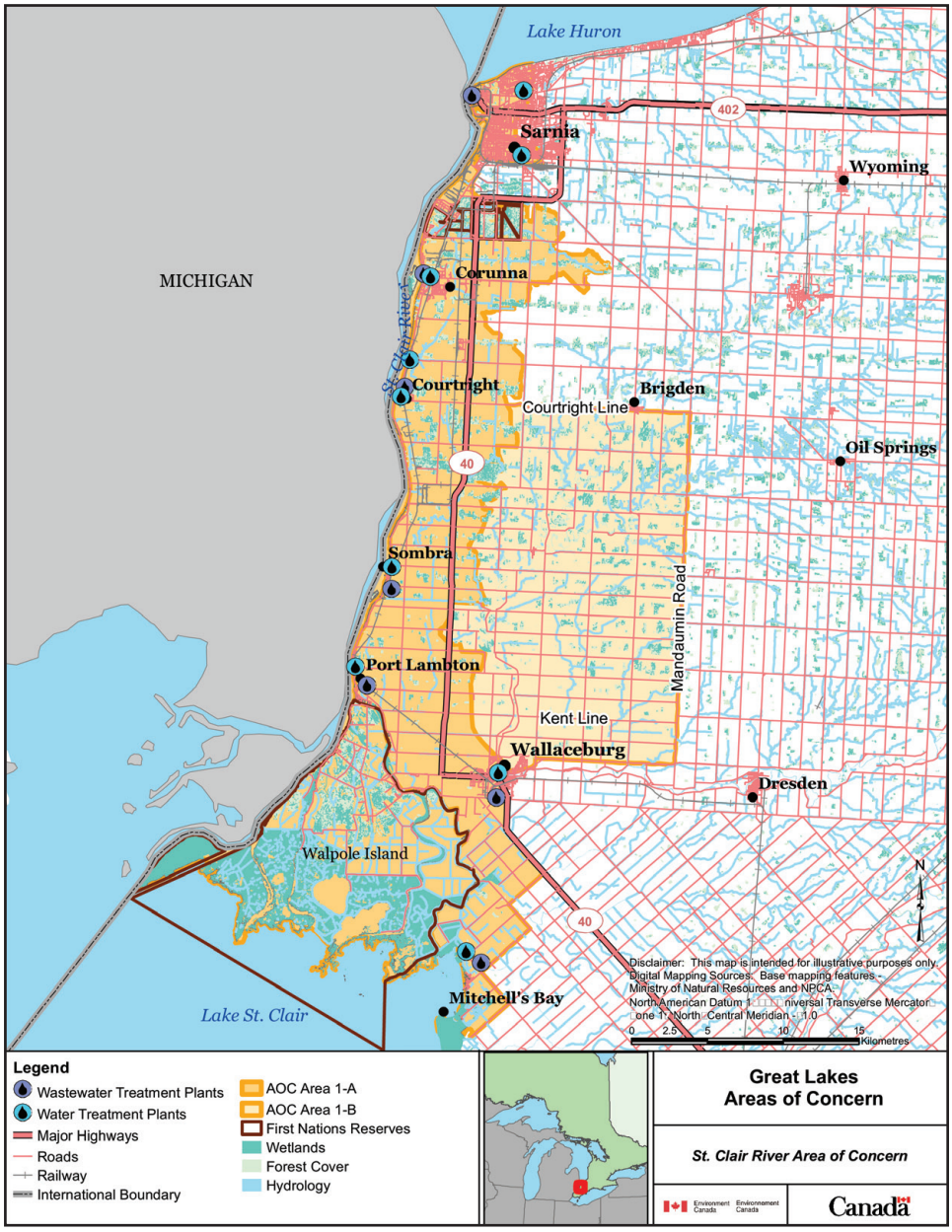
St. Clair River
Area of Concern
Canadian Section
Status of Beneficial Use Impairments
September 2010

The St. Clair River, a key shipping channel in the Great Lakes Seaway system, flows 64 km from Lake Huron to Lake St. Clair. The Area of Concern covers 3350 km^2 (335 000 ha) and includes the river, its delta channels and its immediate drainage basin, composed of the Talford, Baby, Bowens, Clay, and Marshy Creek sub-watersheds. The wetlands and shallow open waters of the lower St. Clair River and Lake St. Clair provide important habitat for many species and are considered some of the most important wetland areas in the Great Lakes basin.

The area supports extensive recreational activities, including sport fishing, boating and swimming. The river is a source of drinking water for shoreline communities, and serves as a source of cooling and process water for industry and thermal generating stations. About 170 000 people live in the area, concentrated in Sarnia, Ontario and Port Huron, Michigan.

For many years, the river has been subject to industrial activity and urban development along its shores. The primary sources of contaminants to the river have been the discharges from a complex of 27 industrial facilities in Ontario in the Sarnia area and 6 in the United States. These sites include a number of large petrochemical plants. Other sources of contaminants include 10 municipal point sources and associated lagoons, urban stormwater runoff, and runoff from agricultural operations in rural areas of the watershed.



Ontario

Canada

PARTNERSHIPS IN ENVIRONMENTAL PROTECTION

The St. Clair River was designated an Area of Concern in 1987 under the Canada–United States Great Lakes Water Quality Agreement. Areas of Concern are sites on the Great Lakes system where environmental quality is significantly degraded and beneficial uses are impaired. Currently, there are 9 such designated areas on the Canadian side of the Great Lakes, 25 in the United States, and 5 (including the St. Clair River) that are shared by both countries. In each Area of Concern, government, community and industry partners are undertaking a coordinated effort to restore environmental quality and beneficial uses through a remedial action plan.

Remedial Action Plan Partners

Responsibility for the St. Clair River Area of Concern is shared jointly by both Canada and the United States. In 1998, Environment Canada, the U.S. Environmental Protection Agency, the Ontario Ministry of the Environment and the Michigan Department of Environmental Quality (now the Department of Natural Resources and Environment) signed the Four Agency Letter of Commitment. The Letter outlined agency roles and responsibilities during implementation of the remedial action plans for three binational Areas of Concern—the St. Clair River, the Detroit River, and St. Marys River.

Environment Canada and the Ontario Ministry of the Environment coordinate the development and implementation of the remedial action plan to protect and restore the St. Clair Area of Concern in Canada. Other partners in the cooperative effort for the Canadian side include (in alphabetical order) the Aamjiwnaang First Nation, the City of Sarnia, the Friends of the St. Clair River, the Municipality of Chatham Kent, the Ontario Ministry of Natural Resources, the Rural Lambton Stewardship Network, the Sarnia-Lambton Environmental Association (formerly Lambton Industrial Society) and member companies, the St. Clair Region Conservation Authority, the Township of St. Clair, and the Walpole Island First Nation.

Remedial Action Plan Process

The Great Lakes Water Quality Agreement requires that remedial action plans be developed and implemented in three stages:

Stage 1: Identifying the Environmental Challenges

In Stage 1, the governments of Canada, Ontario, the United States and the State of Michigan, working with community stakeholders, undertook an extensive program of research and monitoring to assess environmental quality and identify the causes of degradation in the Area of Concern. The ***Stage 1 Remedial Action Plan Report***, summarizing the outcome of these efforts, was completed in 1991. The binational report identified 12 environmental challenges needing to be addressed and known as *beneficial use impairments* in the Remedial Action Plan process. Their current status is described below in **Progress on Environmental Challenges**.

Stage 2: Planning and Implementing Remedial Actions

In Stage 2, the governments of Canada, Ontario, the United States and the State of Michigan, working with community stakeholders, undertook a detailed review of potential remedial actions to restore, protect and monitor environmental quality in both the Canadian and United States sections of the Area of Concern. The ***Stage 2 Remedial Action Plan Report***, which identified 38 recommended remedial actions, was completed in 1995. A progress report was completed by the Canadian Remedial Action Plan Implementation Team in 2005 and an updated work plan for the Canadian side was completed in 2007. As of early 2010, all but one of the remedial actions from the Stage 2 Report are either completed or underway. Implementation of all priority actions is targeted for 2015.

Stage 3: Monitoring Actions and Delisting of the Area of Concern

The ***Stage 3 Remedial Action Plan Report*** and delisting of St. Clair River as an Area of Concern will take place when monitoring confirms that the environmental challenges have been addressed successfully through the remedial actions. As of September 2010, there is no estimate of when St. Clair River will be delisted as an Area of Concern.

PROGRESS ON ENVIRONMENTAL CHALLENGES

The federal and provincial governments and partners have made substantial progress over the past decade on restoring environmental quality within the St. Clair River Area of Concern. All of the main industrial and municipal facilities on the St. Clair River have made progress in controlling and reducing their discharge of chemical and bacterial contaminants into the river. An example of these partnership efforts, which included the removal of 13 300 m^3 of contaminated sediment by Dow Chemical Canada in 2004, is that the widespread pollution of the river bottom that was identified in the 1950s was, by 1990, limited to an area of impact within a 9 km stretch of the river. In addition, considerable progress has been made in protecting and restoring fish and wildlife habitat, including site-specific shoreline habitat enhancement measures, the development of a landowner habitat enhancement program and multi-million dollar efforts to remove combined sewer overflows in the City of Sarnia.

The major challenges remaining include continuing to address sediment contamination in the river downstream of Sarnia; continuing to reduce combined sewer overflows; and continuing efforts to restore creeks, wetlands and forest habitat and promote the naturalization of the St. Clair River shoreline. The prioritization of key remedial actions and the implementation of strategies to complete these actions are targeted for 2015.

Status of Beneficial Use Impairments

The tables below summarize, for each of the 12 beneficial use impairments in the St. Clair River Area of Concern (Canadian Section), their status as of September 2010; key actions taken by various partner agencies and organizations under the Remedial Action Plan; and future key actions planned by the partners as they work towards the full restoration of environmental quality and eventual delisting of the Area of Concern.

Status – IMPAIRED

Added Costs to Agriculture or Industry

Status: ***Impaired***

There are additional costs required to treat water prior to use in industrial or agricultural processes.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Reduced Sarnia's combined sewer overflow volumes into the St. Clair River by 50% since 2000 through more than $50 million in capital upgrades to the city's combined sewer system ▪ Improved wastewater management by local industry	▪ Continue efforts to eliminate combined sewer overflows in Sarnia ▪ Survey river water users to determine whether there continues to be added costs

Beach Closings

Status: ***Impaired***

There are numerous posted advisories that bacterial levels (*E. coli*) exceed safe levels for swimming and other body contact recreational activities at four parks on the Ontario side of the river (Willow, Seager, Cundick, Brander).

KEY ACTIONS

COMPLETED	REMAINING
▪ Upgraded Sarnia's Water Pollution Control Plant from primary to secondary treatment (2001) ▪ Reduced Sarnia's combined sewer overflow volumes into the St. Clair River by 50% since 2000 through more than $50 million in capital upgrades to the city's combined sewer system ▪ Upgraded wastewater treatment for several villages in the Township of St. Clair (2008) ▪ Reduced impacts from agricultural non-point sources through ongoing efforts since 1993	▪ Continue efforts to eliminate combined sewer overflows in Sarnia ▪ Conduct beach monitoring, assess current beach closing data and update the status of this environmental challenge ▪ Continue with the agricultural non-point source pollution control program, with a focus on priority watersheds

Degradation of Aesthetics

Status: ***Impaired***

Aesthetics are degraded as a result of oily surface films, spills and combined sewer overflows.

KEY ACTIONS

COMPLETED	REMAINING
▪ Conducted survey of users of the river to gauge whether degradation of aesthetics continues to be an issue (2007 and 2009)	▪ Survey municipalities, health units, provincial ministries and First Nations to clarify status of this impairment in the St. Clair River ▪ Continue efforts to eliminate combined sewer overflows in Sarnia

Degradation of Benthos[1]

Status: ***Impaired***

There is no significant alteration in the benthic community within stretches of the river downstream of Sarnia compared to communities upstream; however, there are elevated levels of mercury in the benthos within the most impacted 9-km stretch of the river.

KEY ACTIONS

COMPLETED	REMAINING
▪ Conducted benthic surveys between 1993 and 2008 and found no evidence of impairment in the benthic community structure in stretches of the river downstream from Sarnia compared to communities upstream ▪ Completed toxicity tests and a risk assessment on invertebrates and fish respectively related to methyl mercury in the river sediment; the risk assessment identified a potential for mercury biomagnification[2] to some species of fish, due to elevated methyl mercury concentrations in the tissues of benthic invertebrates, a food source for the fish (2009)	▪ Continue to assess environmental risk and develop management actions for contaminated sediments ▪ Continue to track regulated industrial discharges to the river

Loss of Fish and Wildlife Habitat

Status: ***Impaired***

Habitat has been lost due to filling, draining, dredging and bulk-heading for industrial, urban, agricultural and navigational uses. Significant losses of wetlands have occurred, particularly in the Walpole Island delta region. Degradation of fish and wildlife habitat including spawning, nursery and rearing sites has been identified as one of the causes resulting in the reduction and loss of fish and wildlife populations.

KEY ACTIONS

COMPLETED	REMAINING
▪ Implemented habitat restoration projects since 1993 in areas along the shoreline and within various areas of St. Clair River watershed ▪ Carried out two natural shoreline stabilization projects to create fish habitat along the St. Clair River shoreline ▪ Undertook a study of habitat threats in the main tributaries of the St. Clair River	▪ Encourage the use of natural shoreline stabilization techniques by private and municipal landowners through demonstration projects ▪ Continue with the habitat restoration program and focus on priority implementation recommendations of the St. Clair River Remedial Action Plan Work Plan (2007) and the relevant recommendations of the St. Clair River Watershed Plan (2009)

[1] *Benthos* and *benthic community* refer to the invertebrate organisms, such as worms, nymphs and insect larvae that dwell for all or part of their lives in the bottom sediments of lakes and rivers. Scientists often use the health and abundance of these organisms as indicators of contaminant toxicity and ecosystem health.

[2] *Biomagnification* is the increasing concentration of a substance, such as a toxic chemical, in the tissues of organisms at successively higher levels in a food chain. As a result, organisms at the top of the food chain generally suffer greater harm from a persistent toxin or pollutant than those at lower levels.

Restrictions on Dredging Activities

Status: ***Impaired***

The dredging of sediment along the Ontario shoreline from the Sarnia industrial waterfront as far downstream as Stag Island is restricted due to elevated levels of mercury, metals and other organic contaminants.

KEY ACTIONS

COMPLETED	REMAINING
▪ Removed more than 13 300 m^3 of mercury-contaminated sediments (2004) ▪ Conducted preliminary assessment of restrictions on dredging that concluded contaminant concentrations in dredged sediment within the shipping channel meet provincial sediment quality guidelines (2007)	▪ Continue to assess and develop management actions for remaining contaminated sediment priority areas ▪ Finalize the assessment of the status of this beneficial use impairment

Restrictions on Drinking Water Consumption or Taste and Odour Problems

Status: ***Impaired***

Periodic closings of water treatment plant intakes in Ontario have occurred as a result of chemical spills.

KEY ACTIONS

COMPLETED	REMAINING
▪ Mandated industry, through 2007 Ontario regulations, to have spill prevention and contingency plans in place by September 2008 ▪ Initiated study to assess most recent spills data and water treatment plant shutdowns (2008)	▪ Continue to monitor spill incidents ▪ Review and revise the delisting criteria ▪ Undertake a study to assess status of taste and odour complaints

Restrictions on Fish and Wildlife Consumption[3]

Status: ***Impaired***

Restricted consumption of species such as Walleye, Smallmouth Bass and Yellow perch is advised due to elevated levels of mercury, PCBs,[3] pesticides and mirex and photomirex.

KEY ACTIONS

COMPLETED	REMAINING
▪ Implemented federal petroleum refinery regulations and the provincial Municipal/Industrial Strategy for Abatement (MISA) regulations in the mid-1990s, which eliminated persistent toxic substances and addressed other problems associated with industrial discharges entering the St. Clair River ▪ Removed more than 13 300 m^3 of mercury-contaminated sediments (2004) ▪ Continued to monitor ongoing improvements to industrial discharges ▪ Conducted sediment sampling (2005–2008) and identified three priority areas for managing contaminated sediment, based on risk to some species of sport fish (2009)	▪ Continue assessment and development of management actions for contaminated sediments ▪ Continue to monitor sport fish for contaminants

[3] *Polychlorinated biphenyls* (PCBs) are synthetic chemicals that have wide industrial applications. The manufacturing and importing of PCBs were banned in North America in 1977. PCBs are very persistent (long-lasting) in the environment and can be transported over long distances.

Status – REQUIRES FURTHER ASSESSMENT

Bird (or Other Animal) Deformities or Reproduction Problems

Status: ***Requires further assessment***

No evidence of bird or animal deformities was presented in the Stage 1 report; however, deformities have been demonstrated since then in the mouth parts of river bottom microorganisms known as chironomids. Overall, there is a lack of studies examining bird or animal deformities or reproductive problems.

KEY ACTIONS

COMPLETED	REMAINING
▪ Conducted field studies on birds, reptiles, mammals and amphibians (2006–2008)	▪ Determine status of this environmental challenge, based on most recent data

Degradation of Fish and Wildlife Populations

Status: ***Requires further assessment***

The fish community is considered diverse. Information on wildlife populations is lacking and the potential role of contaminants in affecting populations requires further study on a Great Lakes basin-wide basis.

KEY ACTIONS

COMPLETED	REMAINING
▪ Completed wildlife contaminant studies on Snapping Turtles, Forster's Tern, Black Tern and Mink	▪ Complete wildlife contaminant and population studies ▪ Determine status of this environmental challenge, based on most recent data

Fish Tumours or Other Deformities

Status: ***Requires further assessment***

Further data collection and analysis are needed to confirm whether fish tumours exist.

KEY ACTIONS

COMPLETED	REMAINING
▪ Conducted study on 17 fish species that found no tumours in the fish livers (2002) ▪ Conducted an extensive fish liver tumour evaluation study to determine the prevalence of fish tumours (2006)	▪ Determine status of this environmental challenge, based on the most recent data

Tainting of Fish and Wildlife Flavour

Status: ***Requires further assessment***

The recommendation by scientists to re-designate this environmental challenge as *not impaired* was accepted by both the St. Clair Canadian Implementation Committee and the Binational Public Advisory Committee. The Remedial Action Plan partners currently are working through the re-designation process.

KEY ACTIONS

COMPLETED	REMAINING
▪ Conducted survey of anglers that found tainting was not a major concern (2007); this confirms the results of previous studies, including a controlled olfactory sensory evaluation study (1995) and an angler survey (1996–1997) ▪ Survey conducted by Walpole Island First Nation to get response from the community regarding tainting of fish flavour (2009)	▪ Continue to assess all data (including that from Walpole Island First Nation) to determine the status of this environmental challenge

FOR MORE INFORMATION

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www.ec.gc.ca/raps-pas

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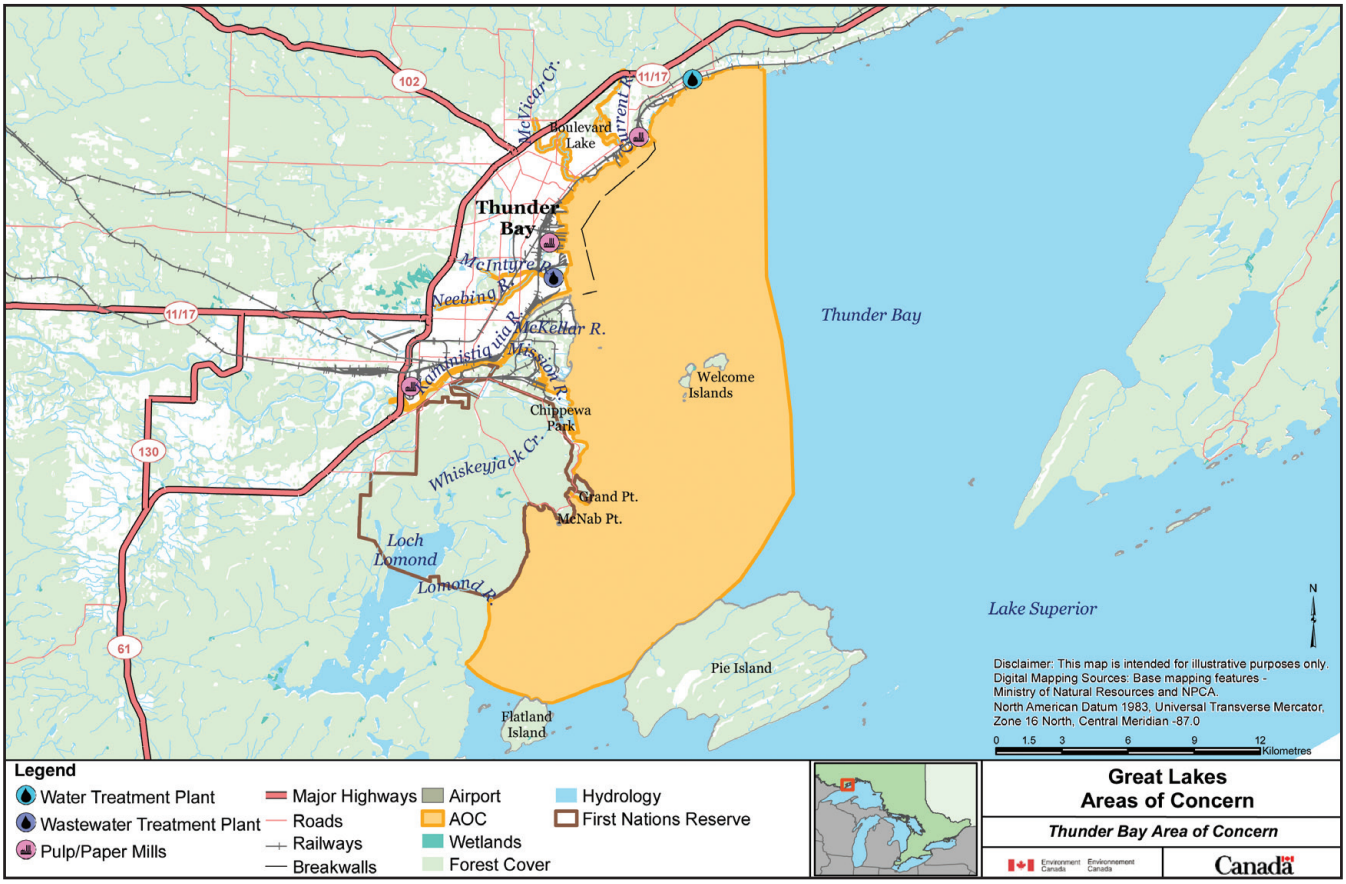
Thunder Bay
Area of Concern
Status of Beneficial Use Impairments
September 2010

The Thunder Bay Area of Concern extends approximately 28 km along the shoreline of Lake Superior from north of Bare Point south to Flatland Island and up to 9 km offshore, including the Welcome Islands. The area's watershed is drained by the Kaministiquia River system and a number of smaller rivers and creeks. The marsh area of the harbour represents a major portion of wetlands in the Lake Superior basin in Canada, providing habitat for nesting and migrating species of birds and a wide variety of fish. The area supports both a commercial and sport fishery. The City of Thunder Bay, one of Canada's largest shipping ports, is the main population centre in the region.

Environmental concerns in the Thunder Bay Area of Concern have focused on the water quality impacts of industrial and urban development along the Thunder Bay waterfront and adjoining tributaries. Over the years, industrialization, dredging, waste disposal, channelization and the release of a number of pollutants have eliminated a significant portion of quality habitat along the waterfront. While improved effluent treatment and changes in industrial processes have significantly reduced impacts in recent years, environmental challenges remain.



Ontario

Canada

PARTNERSHIPS IN ENVIRONMENTAL PROTECTION

Thunder Bay was designated an Area of Concern in 1987 under the Canada–United States Great Lakes Water Quality Agreement. Areas of Concern are sites on the Great Lakes system where environmental quality is significantly degraded and beneficial uses are impaired. Currently, there are 9 such designated areas on the Canadian side of the Great Lakes, 25 in the United States, and 5 that are shared by both countries. In each Area of Concern, government, community and industry partners are undertaking a coordinated effort to restore environmental quality and beneficial uses through a remedial action plan.

Remedial Action Plan Partners

Environment Canada and the Ontario Ministry of the Environment coordinate the development and implementation of the remedial action plans to protect and restore these Areas of Concern in Canada. Other partners in the cooperative effort in the Thunder Bay Area of Concern include (in alphabetical order) the City of Thunder Bay, Confederation College, EcoSuperior Environmental Programs, Fisheries and Oceans Canada, the Lakehead Region Conservation Authority, Lakehead University, the Ontario Ministry of Natural Resources, the Public Advisory Committee and the Thunder Bay District Health Unit.

Remedial Action Plan Process

The Great Lakes Water Quality Agreement requires that remedial action plans be developed and implemented in three stages:

Stage 1: Identifying the Environmental Challenges

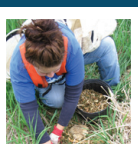
In Stage, 1 the governments of Canada and Ontario, working with community stakeholders, undertook an extensive program of research and monitoring to assess environmental quality and identify the causes of degradation in the Area of Concern. The ***Stage 1 Remedial Action Plan Report***, summarizing the outcome of these efforts, was completed in 1991. The report identified 11 environmental challenges needing to be addressed and known as *beneficial use impairments* in the Remedial Action Plan process.

Stage 2: Planning and Implementing Remedial Actions

In Stage 2, the governments of Canada and Ontario, working with community stakeholders, undertook a detailed review of several potential remedial actions to restore, protect and monitor environmental quality in the Area of Concern. The ***Stage 2 Remedial Action Plan Report***, which identified 38 recommended remedial actions, was completed in 2004. Of the original 11 beneficial use impairments, one was addressed by the time Stage 2 was completed (*added costs to agriculture and industry*). Most of the recommended remedial actions have been completed or are in progress. The current status of the remaining 10 beneficial use impairments is described below in **Progress on Environmental Challenges**.

Stage 3: Monitoring Actions and Delisting of the Area of Concern

The ***Stage 3 Remedial Action Plan Report*** and delisting of Thunder Bay as an Area of Concern will take place when monitoring confirms that the beneficial use impairments have been addressed successfully through the remedial actions. The management of contaminated sediment in the north harbour will take several more years to address. Consequently, as of September 2010, it is difficult to estimate when Thunder Bay will be delisted as an Area of Concern.



PROGRESS ON ENVIRONMENTAL CHALLENGES

The federal and provincial governments and partners have made significant progress in addressing the beneficial use impairments identified through the Remedial Action Plan process. In addition to the specific actions summarized in the tables below, the partners have carried out several important actions that have addressed more than one environmental challenge. Notable successes have included upgrading the main wastewater treatment plant to secondary treatment with UV disinfection, which has significantly improved the quality of effluent entering the lake. The Thunder Bay District Stewardship Council was established to bring together interested landowners, individuals, associations, municipalities, First Nations and resource agencies on such stewardship projects as natural resource education, shoreline restoration and wildlife habitat enhancement. Another major cross-cutting initiative has been the management of contaminated sediment adjacent to the Northern Wood Preservers waterfront industrial property through the Northern Wood Preservers Alternative Remediation Concept (NOWPARC) project. This project involved constructing a rock fill containment berm, a steel wall and clay barrier to isolate the contaminants; removing contaminated sediment by dredging and thermal treatment off-site; and creating 5 ha of fish habitat.

In a collaborative effort with the local industry partners, the Ontario Ministry of the Environment and Environment Canada began the assessment of management options for the contaminated sediment in the Thunder Bay north harbour in 2008. The project steering committee will continue to provide updates to the Public Advisory Committee.

Remedial Action Plan partners will continue working together on the following priority initiatives in support of delisting the Thunder Bay Area of Concern:

- managing contaminated sediment in Thunder Bay north harbour;
- reviewing and revising appropriate targets for restoring the beneficial use impairments;
- developing and implementing a monitoring plan to track progress towards environmental recovery and meeting delisting targets; and
- providing opportunities for community engagement on the remedial actions and monitoring activities.

Status of Beneficial Use Impairments

The tables below summarize, for each of the 10 beneficial use impairments in the Thunder Bay Area of Concern, their status as of September 2010; key actions taken by various partner agencies and organizations under the Remedial Action Plan; and future key actions planned by the partners as they work towards the full restoration of environmental quality and eventual delisting of the Area of Concern.

Status – IMPAIRED

Degradation of Aesthetics

Status: ***Impaired***

Aesthetics are degraded as a result of the presence of industrial development and closed and abandoned facilities along the waterfront.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Completed sediment remediation at NOWPARC, including construction of a natural buffer along the waterfront ▪ Achieved changes in industrial processes and upgrades to wastewater treatment facilities at area pulp and paper mills, following the provincial Municipal/Industrial Strategy for Abatement regulations (1993) and federal pulp and paper regulations (1992) ▪ Demolished the former Pool 6 elevator ▪ Completed Kaministiquia River Heritage Park ▪ Completed improvements at the Mission Marsh Conservation Area, including creation of small bays for fish habitat ▪ Launched community programs such as Spring Up to Clean Up and Litter Free Thunder Bay	▪ Complete additional improvements in Marina Park and continue community cleanup initiatives ▪ Identify options for the redevelopment of the former Pool 6 site ▪ Complete public consultation to confirm targets for addressing this beneficial use impairment

Degradation of Benthos[1]

Status: ***Impaired***

Recent and future monitoring will track recovery of the benthic community below the AbitibiBowater outfall in the Kaministiquia River and near the NOWPARC site. In the north harbour the benthic community remains impaired due to contaminated sediment.

KEY ACTIONS

COMPLETED	REMAINING
▪ Implemented federal pulp and paper regulations and the provincial Municipal/Industrial Strategy for Abatement (MISA) regulations in the mid-1990s, which led to process changes and upgrades to wastewater treatment at area pulp and paper mills ▪ Completed sediment remediation at NOWPARC and began ongoing monitoring ▪ Completed upgrades to the municipal sewage treatment plan ▪ Undertook study (field component) of sediment quality, water quality and benthic communities in the Kaministiquia River (2005) ▪ Commenced assessment of sediment management options for the contaminated sediments in the Thunder Bay north harbour	▪ Identify and evaluate sediment management options and implement the preferred option for the Thunder Bay north harbour ▪ Continue long-term monitoring at the affected sites ▪ Complete reporting for the Kaministiquia River study

Degradation of Fish and Wildlife Populations

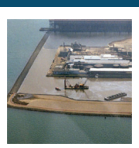
Status: ***Impaired***

Impairment of fish populations has been identified as a result of degraded water quality, increased water temperatures, industrial pollutants, land use development and the introduction of aquatic invasive species.

KEY ACTIONS

COMPLETED	REMAINING
▪ Implemented federal pulp and paper regulations and the provincial Municipal/Industrial Strategy for Abatement (MISA) regulations in the mid-1990s, which led to process changes and upgrades to wastewater treatment at area pulp and paper mills ▪ Assessed the fish community around areas of remediation at the NOWPARC site, concluding that the area now supports good diversity and abundance of fish populations comparable to other areas within the harbour ▪ Developed binational rehabilitation plans for four fish species native to Lake Superior—Brook Trout, Walleye, Lake Sturgeon and Lake Trout—with the overall goal of maintaining, enhancing and rehabilitating self-sustaining populations in areas where the species were originally found ▪ Promoted the recovery of Lake Trout in Lake Superior through cooperative efforts involving stocking programs, Sea Lamprey control measures, limits on sport and commercial fishing, and water quality protection and enhancements ▪ Mapped critical habitat for Lake Sturgeon in the Kaministiquia River and examined the effects of changing water levels and flows on Sturgeon production ▪ Developed and implemented a water management plan (in cooperation with Ontario Power Generation) to address water level fluctuations in the Kaministiquia River and the effect on Lake Sturgeon populations ▪ Commenced assessment of sediment management options for the contaminated sediments in the Thunder Bay north harbour	▪ Identify and evaluate sediment management options and implement the preferred option for the Thunder Bay north harbour ▪ Complete analysis of data collected on fish and wildlife and conduct additional population surveys to assess current status of this environmental challenge ▪ Continue long-term monitoring at the NOWPARC and other created habitat sites to determine impacts of remedial actions on fish populations

[1] *Benthos* and *benthic community* refer to the invertebrate organisms, such as worms, nymphs and insect larvae that dwell for all or part of their lives in the bottom sediments of lakes and rivers. Scientists often use the health and abundance of these organisms as indicators of contaminant toxicity and ecosystem health.



Loss of Fish and Wildlife Habitat

Status: ***Impaired***

Degradation of wetlands and spawning and nursery habitat has been identified as one of the causes resulting in the reduction of Walleye and Lake Sturgeon populations.

KEY ACTIONS

COMPLETED	REMAINING
▪ Undertook various habitat rehabilitation projects to restore and create nearshore aquatic habitat in five tributaries, rehabilitate the littoral zone, stabilize wetlands, improve diversity in rivers, and increase abundance of fish populations ▪ Confirmed that the Kaministiquia River and Neebing, McKellar and Mission marshes provide nursery habitat for young Walleye	▪ Examine the effects of changing water levels and flows on Sturgeon access to spawning habitat in the Kaministiquia River ▪ Monitor the fish community at rehabilitation sites in the Area of Concern, including NOWPARC, to determine whether additional changes or improvements to the fish community have occurred since the mid-1990s

Restrictions on Dredging Activities

Status: ***Impaired***

Dredging of sediment from the inner harbour is restricted due to elevated levels of contaminants. Periodic dredging for navigational purposes will continue; this must be done in compliance with existing requirements to determine appropriate disposal plan in accordance with current regulations.

KEY ACTIONS

COMPLETED	REMAINING
▪ Implemented federal pulp and paper regulations and the provincial Municipal/ Industrial Strategy for Abatement (MISA) regulations in the mid-1990s, which led to process changes and upgrades to wastewater treatment at area pulp and paper mills ▪ Completed sediment remediation at NOWPARC ▪ Commenced assessment of sediment management options for the contaminated sediments in the Thunder Bay north harbour	▪ Identify and evaluate sediment management options and implement the preferred option for the Thunder Bay north harbour

Status – REQUIRES FURTHER ASSESSMENT

Beach Closings

Status: ***Requires further assessment***

While considerable improvements have been undertaken at Chippewa Park, the overall status of this beneficial use impairment remains inconclusive for swimming areas at Chippewa Park and Boulevard Lake.

KEY ACTIONS

COMPLETED	REMAINING
▪ Improved natural flow in the Current River and Boulevard Lake through removal of an old dam on Onion Lake ▪ Completed beach remediation at Chippewa Park, involving the installation of culverts in the breakwall and improved site drainage	▪ Conduct DNA analysis on samples from both sites to identify the sources of bacteria and develop recommendations based on these results ▪ Complete review of targets for restoring this beneficial use impairment

Bird (or Other Animal) Deformities or Reproduction Problems

Status: ***Requires further assessment***

Bird and animal deformities have not been reported within the boundaries of the Area of Concern. However, deformities in Cormorants have occurred at nearby colonies at Cone and Gravel Islands. In the period of 1988–1994 the incidence of deformities was the lowest in the Great Lakes at 1.2 per 10 000; it was still elevated compared to areas outside of the Great Lakes.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ A Canadian Wildlife Service survey on the Great Lakes (1973–1991) indicated that during that time period Cormorant populations were reproducing at normal levels and that the number of colonies on Lake Superior had increased ▪ In the summer of 2000, the CWS resurveyed	▪ Complete assessment of this environmental challenge to determine status

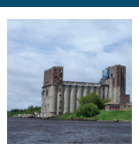
Degradation of Phytoplankton and Zooplankton[2] Populations

Status: ***Requires further assessment***

This beneficial use was assumed to be impaired in the Stage 2 Report, but was not assessed prior to that determination. Results from a 2005 study are still pending.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Achieved changes in industrial processes and upgrades to wastewater treatment facilities at area pulp and paper mills, following the provincial Municipal/Industrial Strategy for Abatement (1993) regulations and federal pulp and paper regulations (1992) ▪ Undertook a study of total phosphorous and chlorophyll (2005)	▪ Complete assessment of this environmental challenge to determine status, following analysis of 2005 study

[2] *Phytoplankton* and *zooplankton* are the collection of small or microscopic water-borne plant and animal organisms (respectively) that float or drift in great numbers, especially at or near the water's surface, and that serve as food for fish and other larger organisms.



Fish Tumours or Other Deformities

Status: ***Requires further assessment***

The incidence of liver tumours in White Suckers sampled in Thunder Bay declined more than 5% between 1985–1990 and 2006. This analysis confirmed that the incidence of tumours in Thunder Bay White Suckers is similar to reference sites. However, the fish collected in Thunder Bay were on average 5 years younger than fish from the reference location.

KEY ACTIONS

COMPLETED	REMAINING
▪ Implemented federal pulp and paper regulations and the provincial Municipal/ Industrial Strategy for Abatement (MISA) regulations in the mid-1990s, which led to process changes and upgrades to wastewater treatment at area pulp and paper mills ▪ Completed sediment remediation at NOWPARC and began ongoing monitoring ▪ Undertook 2006 study of fish tumours with detailed comparison to other sites in the Great Lakes	▪ An additional survey emphasizing older fish would add certainty to the decision on the status of this beneficial use. If the results of the additional fish survey indicate a tumour prevalence of less than 5%, then this beneficial use will be considered restored

Restrictions on Fish and Wildlife Consumption

Status: ***Requires further assessment***

Restricted consumption of Lake Trout, Walleye, Whitefish and other species is advised due to elevated levels of contaminants such as mercury, PCBs,[3] dioxins, furans, chlorinated phenols and pesticides. It is not clear whether sources within the AOC are contributing to this advisory.

KEY ACTIONS

COMPLETED	REMAINING
▪ Implemented federal pulp and paper regulations and the provincial Municipal/ Industrial Strategy for Abatement (MISA) regulations in the mid-1990s, which led to process changes and upgrades to wastewater treatment at area pulp and paper mills ▪ Completed remediation at NOWPARC ▪ Began ongoing monitoring at NOWPARC, including assessing sediment and water quality, and benthic and fish communities to measure changes in the area following remediation (2009) ▪ Diverted mercury from area landfills ▪ Collected sport fish in Thunder Bay inner harbour for contaminant assessment (2005 and 2006) ▪ Commenced assessment of sediment management options for the contaminated sediments in the Thunder Bay north harbour	▪ Continue monitoring of sport fish and long-term monitoring at the NOWPARC site and compare with fish resident outside the AOC

[3] *Polychlorinated biphenyls* (PCBs) are synthetic chemicals that have wide industrial applications. The manufacturing and importing of PCBs were banned in North America in 1977. PCBs are very persistent (long-lasting) in the environment and can be transported over long distances.

FOR MORE INFORMATION

Environment Canada:
www.ec.gc.ca/raps-pas

North Shore of Lake Superior Remedial Action Plans:
www.northshorerap.ca

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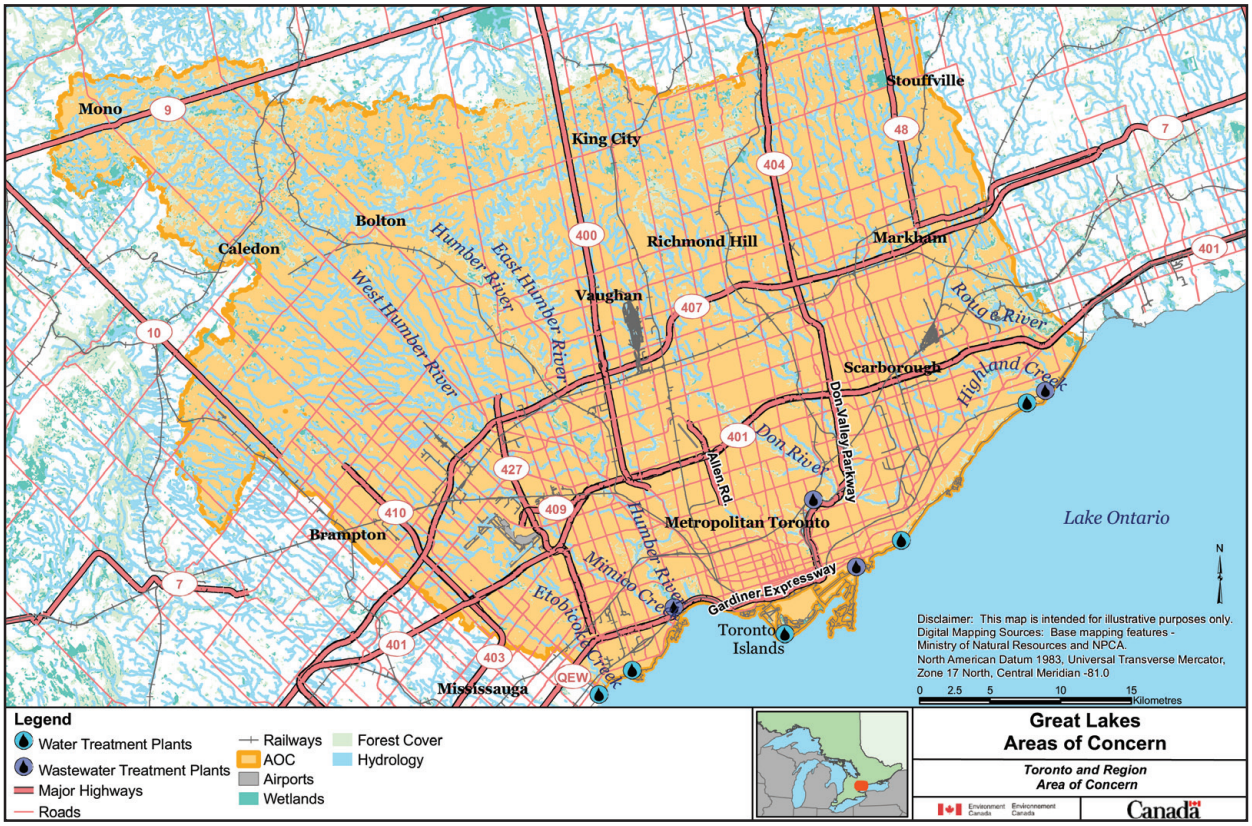
Toronto and Region
Area of Concern
Status of Beneficial Use Impairments
September 2010

The Toronto and Region Area of Concern extends along the northern shoreline of Lake Ontario from the Rouge River in the east to Etobicoke Creek in the west. The 2000 km^2 (200 000 ha) area includes the Toronto waterfront and 6 watersheds: Etobicoke Creek, Mimico Creek, Humber River, Don River, Highland Creek and Rouge River. The drainage basin of these watersheds makes the Area of Concern a study in contrasts: more than 40% of the area is still rural and contains one of the world's largest natural parks in an urban/agricultural setting; at the same time, more than three million people live in the Area of Concern and the City of Toronto is in the centre of the most densely urbanized area in Canada.

The Toronto and Region Area of Concern has long faced complex environmental challenges. Several centuries of agriculture and urban development have dramatically reshaped the natural environment. Wetlands have been infilled, forests and riverbank vegetation removed, creeks buried or channelized, shorelines hardened, and dams and weirs built that obstruct fish migration in the rivers. Currently, contaminants associated with rapid stormwater runoff and melting snow from the area's six watersheds create serious impacts in the rivers and streams as well as at the waterfront itself. Overflows of stormwater mixed with raw sewage are a serious problem in the lower portions of the Don and Humber Rivers and directly along the waterfront following heavy rains. Spills, road runoff, and chemical inputs to sewers from industries and residences further contribute to a degraded aquatic environment. Downstream of the other four Great Lakes and the Niagara River, the Toronto waterfront is also affected by many sources of water-borne contaminants in the Great Lakes system.



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PARTNERSHIPS IN ENVIRONMENTAL PROTECTION

Toronto and Region was designated an Area of Concern in 1987 under the Canada–United States Great Lakes Water Quality Agreement. Areas of Concern are sites on the Great Lakes system where environmental quality is significantly degraded and beneficial uses are impaired. Currently, there are 9 such designated areas on the Canadian side of the Great Lakes, 25 in the United States, and 5 that are shared by both countries. In each Area of Concern, government, community and industry partners are undertaking a coordinated effort to restore environmental quality beneficial uses through a remedial action plan.

Remedial Action Plan Partners

Environment Canada, the Ontario Ministry of the Environment and the Ontario Ministry of Natural Resources coordinate the development and implementation of the Toronto and Region Remedial Action Plans to protect and restore this Area of Concern. Since 2002, the Toronto and Region Conservation Authority has coordinated implementation of the Toronto and Region Remedial Action Plan, under agreements with Environment Canada and the Ontario Ministry of the Environment.

One of the guiding principles of the Toronto and Region Remedial Action Plan process is that "*we all have a role to play in restoring our watersheds and waterfront to health.*" As a result, while the management of the process is the responsibility of the three government agencies and the Conservation Authority, implementation and restoration activities are being carried out by federal and provincial government agencies, the Conservation Authority, municipalities within the Area of Concern, watershed alliances and councils, industries, non-governmental organizations and individual farmers, landowners and residents.

Remedial Action Plan Process

The Great Lakes Water Quality Agreement requires that remedial action plans be developed and implemented in three stages:

Stage 1: Identifying the Environmental Challenges

In Stage 1, the governments of Canada and Ontario, working with community stakeholders, undertook an extensive program of research and monitoring to assess environmental quality and identify the causes of degradation in the Area of Concern. The ***Stage 1 Remedial Action Plan Report – Environmental Conditions and Problem Definition***, summarizing the outcome of these efforts, was completed in 1989. The report identified 11 environmental challenges needing to be addressed and known as *beneficial use impairments* in the Remedial Action Plan process. Their current status is described below in **Progress on Environmental Challenges**.

Stage 2: Planning and Implementing Remedial Actions

In Stage 2, the governments of Canada and Ontario, working with community stakeholders, undertook a detailed review of several potential remedial actions to restore, protect and monitor environmental quality in the Area of Concern. The ***Stage 2 Remedial Action Plan Report – Clean Waters, Clear Choices***, which identified 53 recommended remedial actions, was completed in 1994. Progress reports were issued in 2001 (*Clean Waters, Healthy Habitats*) and in 2007 (*Moving Forward*).

Stage 3: Monitoring Actions and Delisting of the Area of Concern

Remedial Action Plan partners are reviewing restoration targets for the Area of Concern. The ***Stage 3 Remedial Action Plan Report*** will be prepared and delisting of the Toronto and Region as an Area of Concern will take place when monitoring confirms that the environmental challenges have been addressed successfully through the remedial actions. The year 2020 has been proposed as the target date for delisting the Toronto and Region Area of Concern.

PROGRESS ON ENVIRONMENTAL CHALLENGES

The federal and provincial governments and partners have made significant progress in addressing environmental challenges in the Area of Concern. These challenges are linked to both historical factors and new and ongoing pressures from urban development around Canada's largest city. Addressing Toronto's environmental challenges is expected to be a decades-long undertaking. For example, the Wet Weather Flow Management Master Plan, a 25-year effort approved by the City of Toronto in 2003, aims to reduce and ultimately eliminate the adverse effects from runoff during rain and snow events on streams, rivers and the waterfront. The Plan focuses on public education and outreach, municipal operations, waterfront shoreline management, stream restoration and environmental monitoring. Also, the City of Toronto is considering a 100-year plan for the control of water pollution sources.

Coordinating the efforts of the many partner agencies and organizations will continue to be a critical element in the success of the Remedial Action Plan, particularly as the need increases for integrated monitoring to measure progress towards restoration of environmental quality.

Status of Beneficial Use Impairments

The tables below summarize, for each of the 11 beneficial use impairments in the Toronto and Region Area of Concern, their status as of September 2010; key actions taken by various partner agencies and organizations under the Remedial Action Plan; and future key actions planned by the partners as they work towards the full restoration of environmental quality and eventual delisting of the Area of Concern.

Status – IMPAIRED

Beach Closings

Status: ***Impaired***

There are occasional posted advisories that bacterial levels (*E. coli*) exceed safe levels for swimming and other body contact recreational activities at several City of Toronto beaches.

KEY ACTIONS

COMPLETED	REMAINING
▪ Gained better understanding of the various sources of bacteria on beaches through microbial source tracking ▪ Launched several important wet weather flow projects to improve beach water quality, including the Bonar Creek Stormwater Quantity and Quality Treatment Pond and combined sewer overflow and/or storm sewer control studies for the eastern beaches, Scarborough and Coatsworth Cut ▪ Improved water quality at Toronto beaches through wastewater infrastructure improvements, such as construction of the Western and Eastern Beaches Stormwater Detention Facilities, to capture and treat stormwater and combined sewer overflows ▪ Initiated ongoing programs to educate residents on the implications to water quality of feeding birds on the beaches ▪ Launched a highly successful pilot project to use herding dogs to help control waterfowl presence on the swimming beaches ▪ Began implementation of the City of Toronto Beaches Plan, a key to maintaining and improving conditions at city beaches (2009); in 2009, 7 of 11 Toronto beaches achieved the international Blue Flag designation status	▪ Maintain efforts in the rural areas to implement best management practices through Environmental Farm Plans and the Rural Clean Water Program ▪ Continue wet weather flow projects and dry weather flow reduction measures, such as the track down and correction of illegal sewer cross-connections ▪ Implement the Don and Waterfront Trunk Interceptor Capacity and Combined Sewer Overflow Control and Treatment Strategy ▪ Continue implementation of the City of Toronto Beaches Plan

Degradation of Aesthetics

Status: ***Impaired***

Anecdotal evidence suggests that algal growth continues to be a problem, especially along the western shoreline.

KEY ACTIONS

COMPLETED	REMAINING
▪ Launched a range of initiatives focusing on cleaning up beaches and shorelines, including public education on littering and the annual Great Canadian Shoreline Cleanup along Toronto's waterfront and watershed shorelines	▪ Address and monitor bacterial issues along the waterfront through the Blue Flag Beaches program ▪ Continue implementation of the City of Toronto Beaches Plan ▪ Undertake a comprehensive assessment of this environmental challenge and develop a delisting target

Degradation of Benthos[1]

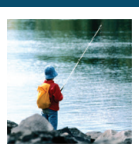
Status: ***Impaired***

Impairment of benthic communities varies in the watersheds, with Highland Creek showing the most impairment and the Rouge and Humber Rivers the least. Along the waterfront, impairment of benthic communities is still seen in areas enriched with nutrients, generally at the outlets of storm sewers and combined sewer overflows in the Keating Channel and in Ashbridge's Bay.

KEY ACTIONS

COMPLETED	REMAINING
▪ Undertook long-term monitoring of the sediment and benthos to obtain data on trends ▪ Conducted benthos study of the Toronto Inner Harbour that observed no acute toxicity at any site as well as a significant decline in the density of pollution-tolerant benthos ▪ Initiated implementation of the Wet Weather Flow Management Master Plan, which is contributing to the restoration of the benthic community along the waterfront	▪ Maintain implementation of the Wet Weather Flow Management Master Plan ▪ Maintain operation of the Regional Watershed Monitoring Network to obtain better long-term data on trends

[1] *Benthos* and *benthic community* refer to the invertebrate organisms, such as worms, nymphs and insect larvae that dwell for all or part of their lives in the bottom sediments of lakes and rivers. Scientists often use the health and abundance of these organisms as indicators of contaminant toxicity and ecosystem health.



Degradation of Fish and Wildlife Populations

Status: ***Impaired***

Fish and wildlife populations are impaired by past wetland and habitat loss and the effects of rapid and continued urbanization.

KEY ACTIONS

COMPLETED	REMAINING
▪ Completed a range of stream restoration, wetland creation and fish barrier mitigation projects to address the needs of fish and wildlife populations ▪ Created or restored more than 40 ha of coastal wetlands in the last 10 years, including at Tommy Thompson Park, Mimico Waterfront Park, Spadina Quay, Rouge Marshes and the mouth of Highland Creek as part of the Toronto Waterfront Aquatic Habitat Restoration Strategy ▪ Worked with conservation partners and landowners to plant an average of 165 000 trees and shrubs a year ▪ Strengthened reforestation efforts to include restoring riverbank vegetation in stream and river valleys ▪ Developed the Terrestrial Natural Heritage System Strategy and a series of watershed-based fisheries management plans and habitat improvement plans to provide long-term blueprints to guide future improvements in fish and wildlife habitats ▪ Updated the watershed plans for the Rouge and Humber River ▪ Completed recovery strategies for Redside Dace, Peregrine Falcon and Jefferson Salamander	▪ Maintain work on restoration and protection of priority habitats and species, under the Toronto Waterfront Aquatic Habitat Restoration Strategy, the Terrestrial Natural Heritage System Strategy, species recovery strategies and the fisheries management plans ▪ Reintroduce Atlantic Salmon in the Humber River

Eutrophication[2] or Undesirable Algae

Status: ***Impaired***

While levels of phosphorus along the waterfront frequently meet provincial guides, levels of phosphorus in the watershed frequently exceed provincial guidelines. Algal growth continues to be a problem along the western part of the waterfront.

KEY ACTIONS

COMPLETED	REMAINING
▪ Decreased phosphorous loading into waterways through improvements to the stormwater infrastructure, including targeted combined sewer separation projects; installation of new infrastructure; evaluation and demonstration of sustainable technologies; and ensuring best management practices on construction sites ▪ Addressed concerns about eutrophication through wet weather flow projects and dry weather flow reduction measures	▪ Maintain efforts in the rural areas to implement best management practices through Environmental Farm Plans and the Rural Clean Water Program ▪ Continue wet weather flow projects and dry weather flow reduction measures ▪ Ensure stormwater management facilities in the upper reaches of the watersheds are operating properly ▪ Implement low impact development guidelines at new development sites ▪ Implement the Don and Waterfront Trunk Interceptor Capacity and Combined Sewer Overflow Control and Treatment Strategy

[2] *Eutrophication* (or *eutrophic conditions*) is the process by which lakes and other water bodies are enriched by nutrients (usually phosphorus and nitrogen), which leads to excessive plant growth and oxygen depletion.

Loss of Fish and Wildlife Habitat

Status: ***Impaired***

Loss and degradation of diverse fish and wildlife habitats throughout the Area of Concern over many years have been identified as leading causes of widespread losses in species abundance and diversity. Loss of habitat along rivers continues due to urbanization, particularly in headwater or intermittent streams. Fragmentation and isolation of existing or newly created habitats is of concern. Gains from habitat restoration and creation projects tend to be offset by the effects of continued and rapid urbanization.

KEY ACTIONS

COMPLETED	REMAINING
▪ Completed a range of projects to address fish and wildlife habitat loss, including stream restoration, wetland restoration and creation, and fish barrier mitigation projects ▪ Strengthened watershed regulations to protect floodplains and wetlands from development ▪ Created Rouge Park, the largest urban natural environment park in the country ▪ Removed or modified critical barriers along waterways to permit fish passage in the Area of Concern, allowing lake fish such as Rainbow Trout to migrate ▪ Created and improved fish and wildlife habitat as part of the revitalization of the Toronto waterfront, including the Port Union and Mimico shoreline projects, the Western Beaches Watercourse Facility, HTO Park, Harbourfront Promenade, wavedecks at Spadina, Rees and Simcoe slips, wetlands at Bluffer's Park and shoreline restoration and carp barriers at Ontario Place ▪ Constructed a 7.7–ha coastal marsh in Tommy Thompson Park, the largest constructed wetland in the Greater Toronto waterfront area (2003)	▪ Continue work on protecting and restoring priority habitat, through the Terrestrial Natural Heritage System Strategy, the fisheries management plans and the Toronto Waterfront Aquatic Habitat Restoration Strategy ▪ Support efforts of municipalities to implement progressive planning techniques that will allow for low-impact development

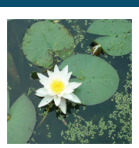
Restrictions on Dredging Activities

Status: ***Impaired***

While contaminant levels have generally improved in sediments near the surface, they still exceed provincial chemical water quality guidelines for open water disposal.

KEY ACTIONS

COMPLETED	REMAINING
▪ Sampled navigational dredging for contaminant levels to determine whether the materials can be used in restoration projects along the waterfront; in the past, all dredged material would be disposed of in the confined disposal cells at Tommy Thompson Park; more recently, however, some dredged material has met lakefill quality guidelines and has been used in restoration projects along the waterfront (for example, dredged material from the Coatsworth Cut was used in the creation of wetlands within the embayments at Tommy Thompson Park) ▪ Continued to deposit dredged material coming out of the Keating Channel in the confined disposal cells at Tommy Thompson Park, though there have been overall improvements in the quality of that material ▪ Reduced the amount of contaminants discharged into the sewer systems and ultimately into Lake Ontario through new, more stringent sewer use bylaws in various municipal jurisdictions ▪ Provided training and educational materials on erosion and sediment control practices	▪ Maintain sampling of dredging material to ensure appropriate end disposal or use ▪ Ensure compliance with sediment and erosion control guidelines, such as The Erosion and Sediment Control Guideline for Urban Construction, to reduce sedimentation of the rivers and river mouths



Restrictions on Fish and Wildlife Consumption

Status: ***Impaired***

PCBs,[3] dioxins and furans are the major cause of consumption restrictions throughout Lake Ontario. Consumption advisories for fish in the Area of Concern persist. Generally, the larger sizes of fish and top predators are of more concern due to the biomagnification[4] of toxics. Contaminant levels in local fish species, such as Northern Pike found in the Inner Harbour, are improving significantly, while salmonid fish species such as Lake Trout and Chinook Salmon, which can feed over wide geographic areas outside the Area of Concern, tend to accumulate higher concentrations of PCBs and mercury.

KEY ACTIONS

COMPLETED	REMAINING
▪ Reduced contaminant loadings through components of the Wet Weather Flow Management Master Plan such as source control measures (for example, rainwater "harvesting" and tree planting) and end-of-pipe facilities ▪ Reduced the amount of contaminants discharged into the sewer systems and ultimately into Lake Ontario, through new sewer use bylaws in various municipal jurisdictions in the Area of Concern ▪ Identified an ongoing source of PCBs into Etobicoke Creek; responsible parties are currently taking steps to further define the sources	▪ Undertake further assessment to determine whether consumption advisories are linked to lakewide conditions rather than conditions within the immediate region or Area of Concern ▪ Determine sources and distribution of PCBs in Etobicoke Creek and develop appropriate management option ▪ Continue implementation of the Wet Weather Flow Management Master Plan

Status – REQUIRES FURTHER ASSESSMENT

Bird (or Other Animal) Deformities or Reproduction Problems

Status: ***Requires further assessment***

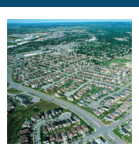
Studies in 2004 suggested that reproductive effects and deformities in colonial waterbirds due to contaminants are not an impaired use in the Area of Concern; these findings still need to be peer-reviewed.

KEY ACTIONS

COMPLETED	REMAINING
▪ Conducted studies on the effect of contaminants on colonial waterbirds in the Area of Concern (2004)	▪ Complete documentation for reporting this environmental challenge as *not impaired*

[3] *Polychlorinated biphenyls* (PCBs) are synthetic chemicals that have wide industrial applications. The manufacturing and importing of PCBs were banned in North America in 1977. PCBs are very persistent (long-lasting) in the environment and can be transported over long distances.

[4] *Biomagnification* is the increasing concentration of a substance, such as a toxic chemical, in the tissues of organisms at successively higher levels in a food chain. As a result, organisms at the top of the food chain generally suffer greater harm from a persistent pollutant than those at lower levels.



Degradation of Phytoplankton and Zooplankton[5] Populations

Status: ***Requires further assessment***

Lakewide factors, physical factors and local pollution sources influence the health of phytoplankton and zooplankton communities; however, there is insufficient information to determine the relative significance of local sources.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ No specific actions to date	▪ Undertake an assessment of this environmental challenge and develop a delisting target

Status – NOT IMPAIRED

One environmental challenge has been designated as *not impaired*, following implementation of remedial actions.

Fish Tumours or Other Deformities

Status: *Not* ***Impaired***

Studies carried out in 2003, 2004 and 2006 along with historical evidence and data, identified that liver tumours are not impaired in the Area of Concern.

KEY ACTIONS	
COMPLETED	**REMAINING**
▪ Completed documentation in 2010 for reporting this environmental challenge as *not impaired*	▪ No further action required

[5] *Phytoplankton* and *zooplankton* are the collection of small or microscopic water-borne plant and animal organisms (respectively) that float or drift in great numbers, especially at or near the water's surface, and that serve as food for fish and other larger organisms.

FOR MORE INFORMATION

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www.torontorap.ca

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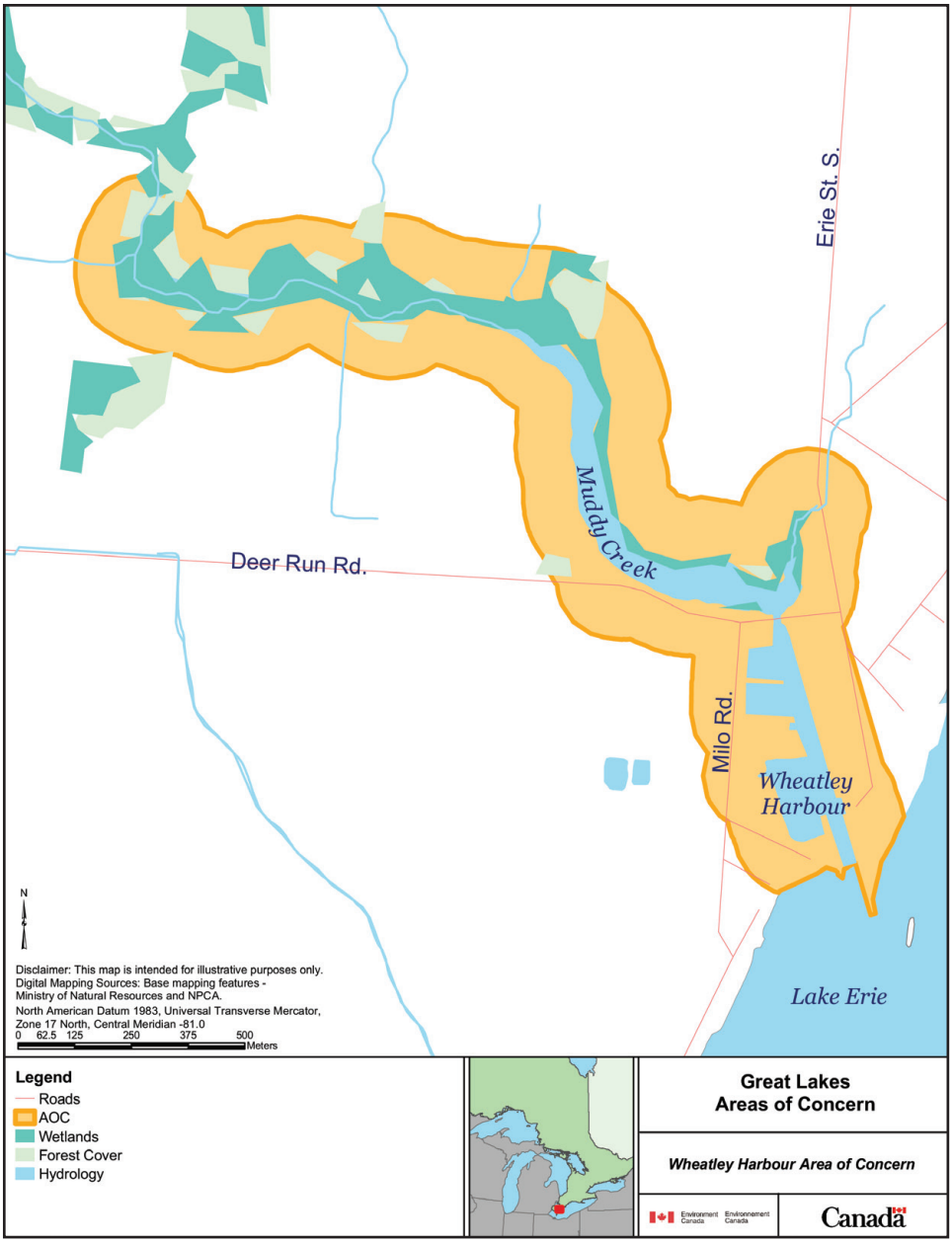
Wheatley Harbour
Area of Concern
Final Progress Report
September 2010

Wheatley Harbour is a small harbour on the north shore of Lake Erie, just east of Point Pelee, Ontario. The Area of Concern, the only one on the Canadian shore of Lake Erie, encompasses the harbour and the Muddy Creek wetland, a provincially significant wetland about 13 ha in size. Land use in the watershed is predominantly agricultural. The harbour is home to the largest commercial fishing fleet in the Great Lakes and the site of fish and vegetable processing facilities. The harbour is designated a federal small craft harbour and is managed by a local harbour authority.

In the past, the Wheatley Harbour Area of Concern experienced significant water pollution problems. Concentrated industrial discharges from the fish processing operations resulted in levels of PCBs[1] in sediments and levels of phosphorus in water that exceeded provincial standards. Runoff from agricultural operations in the area also resulted in contaminated levels of some metals. The construction of the harbour and the infilling of some of the wetlands for industrial development impacted habitat for fish, waterfowl and other wetland wildlife.



[1] *Polychlorinated biphenyls* (PCBs) are synthetic chemicals that have wide industrial applications. The manufacturing and importing of PCBs were banned in North America in 1977. PCBs are very persistent (long-lasting) in the environment and can be transported over long distances.

Ontario

Canada

PARTNERSHIPS IN ENVIRONMENTAL PROTECTION

Wheatley Harbour was designated an Area of Concern in 1987 under the Canada–United States Great Lakes Water Quality Agreement. Areas of Concern are sites on the Great Lakes system where environmental quality is significantly degraded and beneficial uses are impaired. Currently, there are 9 such designated areas on the Canadian side of the Great Lakes, 25 in the United States, and 5 that are shared by both countries. In each Area of Concern, government, community and industry partners are undertaking a coordinated effort to restore environmental quality through a remedial action plan.

Remedial Action Plan Partners

Environment Canada and the Ontario Ministry of the Environment coordinate the development and implementation of the remedial action plans to protect and restore these Areas of Concern in Canada. Other partners in the cooperative effort in the Wheatley Harbour Area of Concern include (in alphabetical order): the Essex County Stewardship Network, the Essex Region Conservation Authority, the Ontario Ministry of Agriculture, Food and Rural Affairs, and the Ontario Ministry of Natural Resources. The Remedial Action Plan partners also have worked with other groups in the community including the Mersea Township, the Municipality of Wheatley, the Southwest Outdoors Club, industry and landowners.

Remedial Action Plan Process

The Great Lakes Water Quality Agreement requires that remedial action plans be developed and implemented in three stages:

Stage 1: Identifying the Environmental Challenges and

Stage 2: Planning and Implementing Remedial Actions

The governments of Canada and Ontario, working with community stakeholders, undertook an extensive program of research and monitoring to assess environmental quality and identify the causes of degradation in the Area of Concern. They also carried out a detailed review of several potential remedial actions to restore, protect and monitor environmental quality in the Area of Concern.

A combined Stage 1 and ***Stage 2 Remedial Action Plan Report*** was completed in 1998. The report identified five environmental challenges needing to be addressed and known as *beneficial use impairments* in the remedial action plan process. The report also included a prioritized list of nine remedial measures proposed by the partners and endorsed by the public to address the environmental challenges. All five of the original beneficial use impairments have been restored through implementation of the remedial actions. These are described below in **Progress on Environmental Challenges**.

Stage 3: Monitoring Actions and Delisting of the Area of Concern

Wheatley Harbour has been delisted as an Area of Concern. All remedial actions recommended in the 1998 report, as well as other initiatives developed by the partners in 2004, were completed by 2008. The ***Stage 3 Remedial Action Plan Report***, reporting on the results of monitoring undertaken to confirm that the environmental challenges have been addressed successfully through the remedial actions, was completed in 2009. In April 2010, community stakeholders and government officials gathered to celebrate the delisting of Wheatley Harbour Area of Concern, a major milestone for the Great Lakes.

PROGRESS ON ENVIRONMENTAL CHALLENGES

The Remedial Action Plan partners have successfully addressed the five environmental challenges identified in the Wheatley Harbour Area of Concern. The ***Stage 3 Remedial Action Plan Report*** was completed in 2009, and Wheatley Harbour has been delisted as an Area of Concern.

Continued navigational dredging is expected to remove any remaining PCBs from the harbour. Ongoing issues with a regional scope, such as invasive species and nutrients, will continue to be addressed under the Lake Erie Lakewide Management Plan.

Status of Beneficial Use Impairments

The tables below summarize, for each of the five beneficial use impairments in the Wheatley Harbour Area of Concern, their status as of September 2010 and key actions taken by various partner agencies and organizations under the Remedial Action Plan. There are no key actions remaining as all five beneficial use impairments are no longer impaired.

Status – NOT IMPAIRED

Degradation of Fish and Wildlife Populations

Status: ***Not Impaired***

Current data indicate that fish and wildlife populations in the Area of Concern are healthy. The fish community appears balanced and diverse, and the relative abundance of fish in 2008 was much higher than in 1987. Snapping Turtles are abundant, with a variety of size classes ranging from small juveniles to large mature adults. Elevated PCB concentrations and some level of physiological alteration have been noted in fish, Snapping Turtles and Tree Swallows, but these effects have not translated into any reproductive impacts in these species.

KEY ACTIONS

COMPLETED	REMAINING
▪ Launched projects to restore natural habitat in the Area of Concern and remediate non-point sources of pollution in the Muddy Creek watershed (since 1998) ▪ Conducted an ecological risk assessment that concluded there were no potential impacts of contaminated sediments to indicator wildlife species[2] (2007) ▪ Undertook fish community monitoring, Snapping Turtle population and health effects study; and Tree Swallow reproductive viability study	▪ No further action required

Eutrophication[3] or Undesirable Algae

Status: ***Not Impaired***

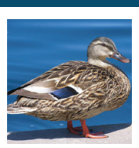
While total phosphorus concentrations in the Area of Concern continue to be elevated, they remain similar to (and in some cases lower than) those in other wetland and creek systems in the region outside the Area of Concern. Discharges from the Omstead Foods Limited now are regulated and phosphorus concentrations are within the bounds established by the provincial certificate of approval. Dissolved oxygen conditions with the Area of Concern have improved considerably since the 1960s and there have been no reports of persistent algal blooms or nuisance algae.

KEY ACTIONS

COMPLETED	REMAINING
▪ Implemented erosion control measures, septic system upgrades, and naturalization of riparian areas through a rural non-point source remediation program in the Muddy Creek watershed (since 1998) ▪ Improved wastewater treatment by local industry (regulated by a certificate of approval) ▪ Initiated two provincial water quality monitoring network sampling sites to monitor nutrient concentrations in and upstream of the Area of Concern (2003) ▪ Undertook periodic monitoring of total phosphorous and dissolved oxygen in the wetland and harbour	▪ No further action required

[2] *Indicator species* are species whose presence, absence, or relative well-being in a given environment is a sign of the overall health of its ecosystem.

[3] *Eutrophication* (or *eutrophic conditions*) is the process by which lakes and other water bodies are enriched by nutrients (usually phosphorus and nitrogen), which leads to excessive plant growth and oxygen depletion.



Loss of Fish and Wildlife Habitat

Status: ***Not Impaired***

The Remedial Action Plan target for natural areas cover in the Area of Concern has been surpassed. Sediments in the waters of the Area of Concern are moderately contaminated with PCBs, but do not pose a risk to indicator fish and wildlife. There are no active sources of PCBs in the Area of Concern and the contaminated sediments within the wetlands are stable and continue to be covered by clean sediment from upstream.

KEY ACTIONS

COMPLETED	REMAINING
▪ Programs to restore habitat in the Area of Concern and to remediate impacts of non-point source pollution in the Muddy Creek watershed have been in place since 1998 ▪ Designated the Muddy Creek wetland a provincially significant wetland (1985) and included it in the town's Official Plan (1999) ▪ Re-inventoried the Muddy Creek wetland and expanded the significant wetland to include upper portions (2007) ▪ Conducted an ecological risk assessment that concluded there were no potential impacts of contaminated sediments to upper trophic-level wildlife (2007)	▪ No further action required

Restrictions on Dredging Activities

Status: ***Not Impaired***

Navigational dredging of the harbour mouth occurs on an annual basis and is completely unrestricted. The inner harbour was dredged in 1984–1985 and in 2004–2005, with the dredged material being disposed of on land. Sediment chemistry data suggest that the inner harbour dredging in 2005 resulted in reduced concentrations of cadmium and PAHs[4] in the sediments. Partners have confirmed that there are no active sources of PCBs in the Area of Concern. Continued routine maintenance dredging of the inner harbour in the future is expected to remove additional contaminated sediments.

KEY ACTIONS

COMPLETED	REMAINING
▪ Maintained annual dredging of the harbour mouth, with disposal of material in Lake Erie ▪ Dredged the inner harbour and disposed of material on land (1985 and 2005) ▪ Conducted monitoring of sediment chemistry pre- and post-inner harbour dredging (2004 and 2008) ▪ Eliminated PCB sources in the Area of Concern through upgraded wastewater treatment by local industry and revised backwash procedures by local wastewater treatment plant ▪ Investigated potential ongoing sources of PCBs to confirm that there are no ongoing sources in the Area of Concern	▪ No further action required

[4] *Polycyclic aromatic hydrocarbons* (PAHs) are chemical compounds found in oil, coal, and tar deposits, and that also are produced as byproducts of fuel burning (whether fossil fuel or biomass). As pollutants, they are of concern because some compounds have been identified as carcinogenic.

Restrictions on Fish and Wildlife Consumption

Status: ***Not Impaired***

Overall, consumption restrictions in Wheatley Harbour appear to be consistent with those in the central basin of Lake Erie. Wheatley Harbour Carp have shown significant declines in PCB concentrations since the 1980s and Brown Bullhead have low PCB concentrations and no restrictions on consumption.

KEY ACTIONS

COMPLETED	REMAINING
▪ Eliminated PCB sources in the Area of Concern through upgraded wastewater treatment by local industry and revised backwash procedures by local water treatment plant ▪ Removed PCBs from sediments through ongoing navigational dredging of the harbour ▪ Confirmed through monitoring that there are no ongoing sources of PCBs in the Area of Concern ▪ Promoted natural capping of PCB contaminated sediments with clean sediment from upstream flows ▪ Separated out Wheatley Harbour from the Ontario Sport Fish Contaminants Monitoring Program's central basin sampling area to allow more effective monitoring in the Area of Concern	▪ No further action required

FOR MORE INFORMATION

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